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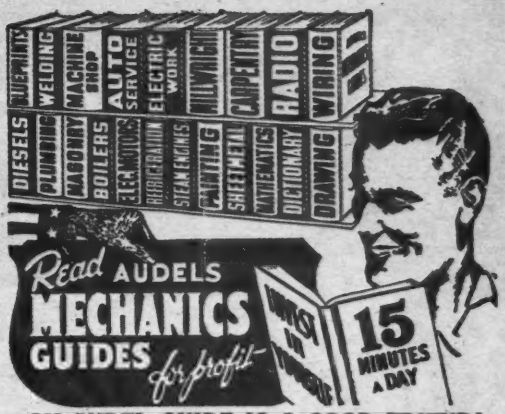

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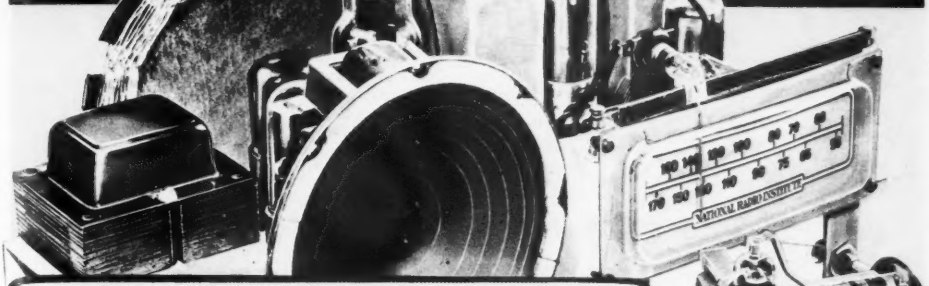

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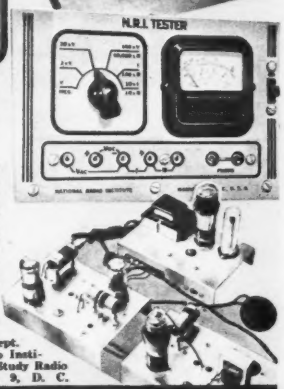

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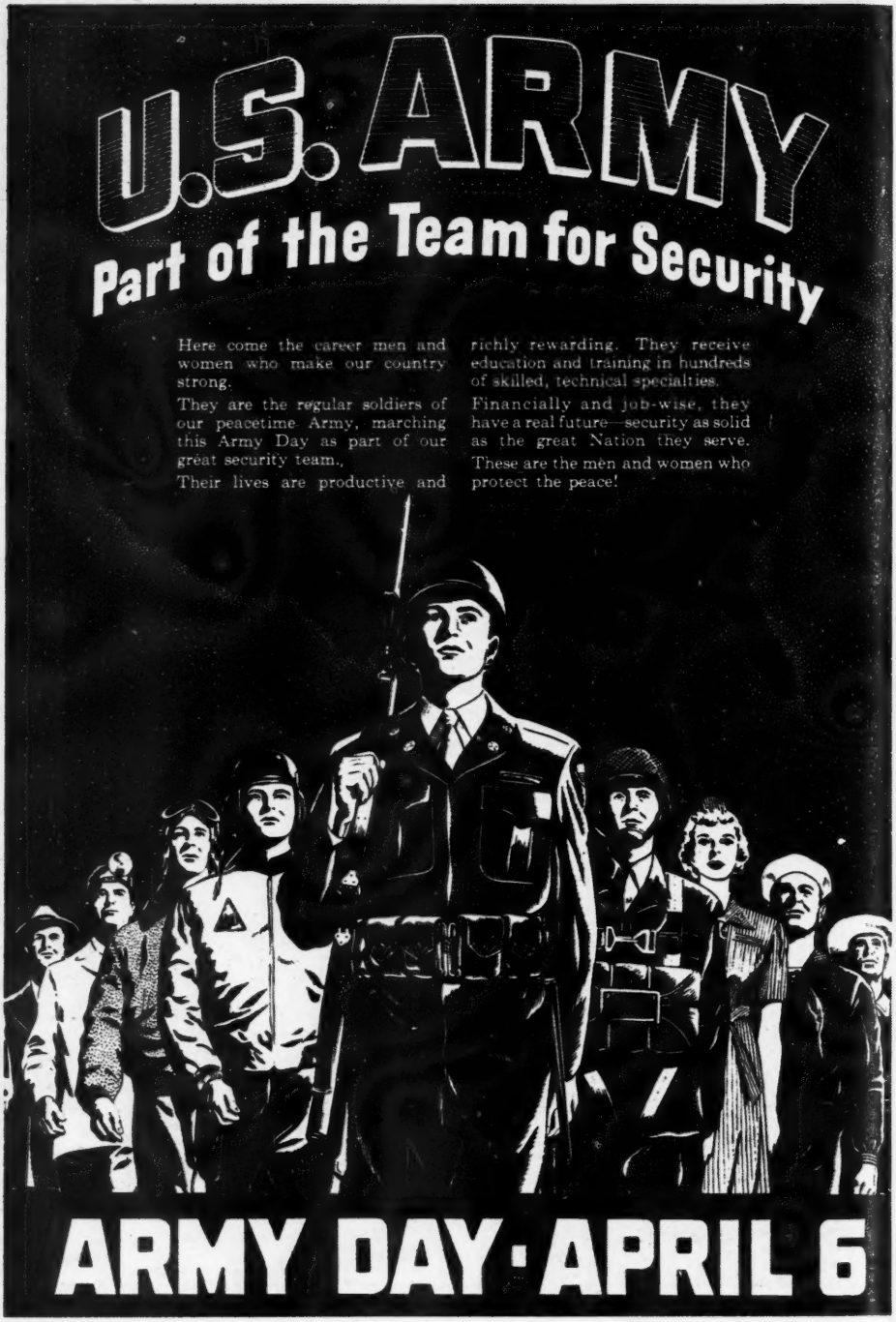
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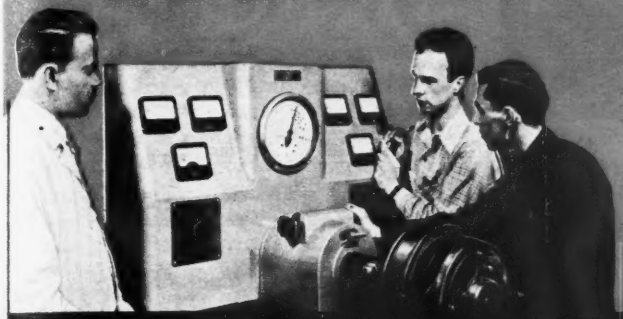

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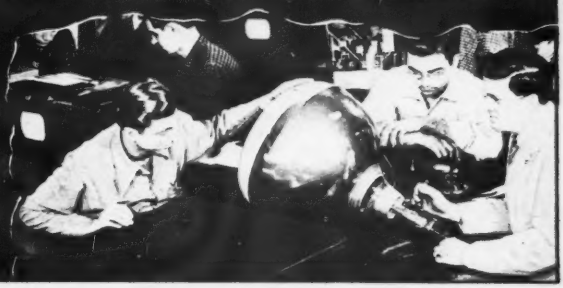
(Right — Instructor explaining operation of 20-inch Cathode Ray tube used in Dumont Television Set.)



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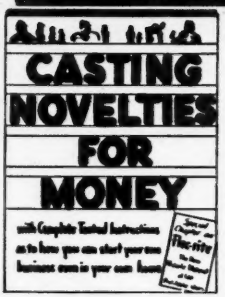

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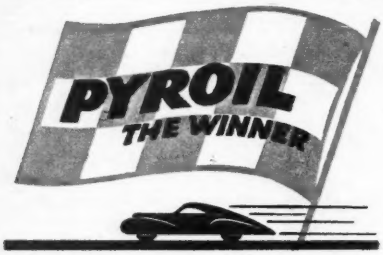

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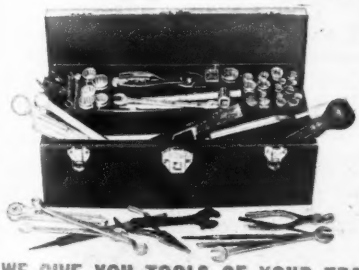

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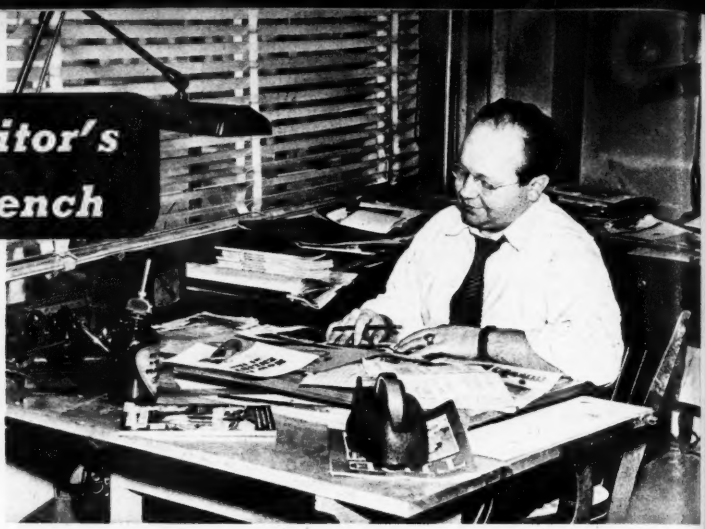
The Editor's Workbench



Frank A. Taggart, MI's Art Editor, looks pretty happy about the whole situation as he plots future layouts for (y)our favorite magazine.

Tooting Our Own Telescope

"Congratulations!" congratulates W. R. Cole of the Eastern Telescope Makers Association, a brand-new group of amateur Galileos who—like so many MI readers—have discovered the fascination of star-gazing through the eyepiece of a telescope they built with their own hands.

"MECHANIX ILLUSTRATED is one of the few well-known science magazines that have a special feature especially devoted to telescope makers. MI has always been a favorite magazine of mine and now that you have finally recognized ATM's I am proud to read it."

And proud are we, Mr. Cole, to receive a letter like yours. We're also proud to announce to you and to the hundreds of readers who have constructed MI's Portable Six-Inch Telescope that in the May issue we're going to show you how you can use your telescope *as a camera* with really startling results.

Big Bertha cameras, like those used by baseball photogs to snap sensational closeups of DiMaggio sliding into third base, usually have a lens with a focal length of about 40 inches. But listen to this! By hooking up your camera and your telescope, you can take pictures equivalent to what you'd get with a lens with a focal length of *54 inches*.

How? It's a snap. We'll tell you all about it on next month's Amateur Telescope Maker's Page.

Base in Space

Two hours after Defense Secretary Forrestal was quoted on front-page headlines all over the country as saying that U. S. military and naval scientists were researching the possibilities of building great flying platforms hundreds of miles above the earth's surface—platforms which not only would open up vast new and unexplored scientific frontiers but would give their possessors, us, military control of the world—Artist-writer Frank Tinsley was in our office with rough sketches showing how these platforms *could* be built.

Two days later we were looking at intricately detailed drawings he had worked out to prove that his theories were not mere dream dust but were based on solid scientific principles. If he'd had any tickets for the first flight, we'd have bought them without further questions. You'll find Frank's article and drawings on pages 92-95, under the title Fortress on a Skyhook.

[*Continued on page* 41]

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Coming up in next month's MI are plans for constructing this 60-mph Cracker-box Class racer, powered with a Mercury V-8 engine. Be sure to look for it!

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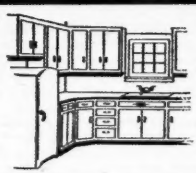

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Address your inquiries to "Your Invention Clinic," MECHANIX ILLUSTRATED, 67 West 44th Street, New York 18, N. Y. Mr. Kraus will answer as many letters as possible in this column. His services are free.

Gyro for Motorcycle

Emmett C. Cannaan of Chicago forwards us diagrams for a gyro to keep a motorcycle upright and thus prevent skidding. He wants to know what we think of the scheme.

ANSWER: One of the oldest mechanical toys is a bicycle with a gyro to make the toy bike stand upright even when you stop it. But a gyro on a motorcycle is worthless. The gyro won't make the motorcycle skid-proof but will tend to make the vehicle skid even more than it normally would.

A 'cycle going around a turn banks to prevent a skid. The gyro would interfere with this banking action and try to make the vehicle run in a straight line. So, while your vehicle would remain upright at slow speeds, it would be dangerous on anything but a perfectly straight path. Forget it.

Camera Trigger Lock

Joseph L. Fortin of Quebec, Canada, wants to know what we think of a trigger lock to prevent double exposures with a box camera.

ANSWER: Locking the trigger of the camera after each exposure is no help unless you can release the trigger only after the film is advanced to a new position. Such a gadget must be attached to the box camera because the camera manufacturer is not likely to pay for anything that will raise the cost of his product considerably.

In more expensive cameras, setting the film automatically cocks the shutter. It's difficult to double-expose with these models. Your idea would be good only if you can make the lock cheaply as a coupling mechanism that any box-camera fan can attach. Remember that in a box camera you are dealing with photography in its cheapest form. Such a camera isn't meant to work perfectly under every condition.

Truck-Tire Carrier

O. F. Ullman of Ellsworth, Kans., asks us to comment on his patent for a truck-tire carrier. It includes a block and tackle for setting the tire into the carrier.

ANSWER: The average truck comes equipped with a tire carrier. Why should a fleet operator remove this carrier and go to the expense of substituting yours, merely to make it easier for the driver to change a tire?

This idea is weak because of the sales angle. Its best value would be to a manufacturer of trucks. If a manufacturer again offers shortage of material as an excuse for turning down your idea, you should offer to supply him with all the angle iron he will need—provided he guarantees to produce your carrier and pay the cost of the material.

Turn Signal

W. F. Cooper of Bell, Calif., wants our criticism of a neon signal that he has designed to make life safer for pedestrians.

ANSWER: We find no fault with the signal itself, but we doubt that it would cut traffic accidents and do not agree with your statistical evaluation.

Your signal is to be used only on turns. If a pedestrian cannot see headlights, how do you expect him to see the neon flash from your signal? The light certainly will not help the driver to pick out the pedestrian in the dark nor veer around the points of danger.

You are doing a lot of wishful thinking to justify your design. Neon signals have been produced in the shape of moving arrows. Unless you can reduce the manufacturing costs, your unit looks impractical to us.

Fishhook Unhooker

Charles E. Winebrenner of Garrett, Ind., has an idea for a bent-wire unit to release hooks from the mouths of fish.

ANSWER: This looks like a good gadget. Only a comparative test with a regulation metal disgorger, though, would show exactly how well unhooking device would work.

We are glad to hear that you are manufac-

[Continued on page 24]

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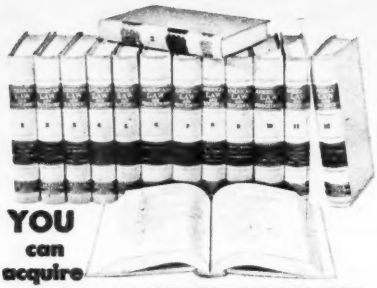

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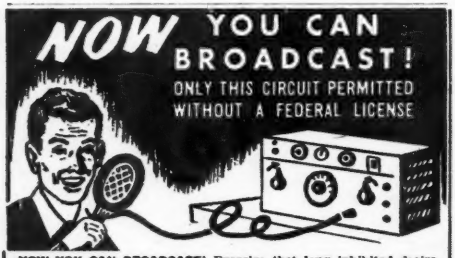

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Your Invention Clinic

[*Continued from page 22*]

turing the gadget yourself. Because of the low cost, you may be able to sell your unhooker to the ten-cent stores. If you set up the unit on a colorful instruction card, you should have a chance to put over a big deal.

Low-Air Tire Alarm

George Kincannon of Madison, Wis., sends a description of a device which sounds a signal when the air in your tires is low.

ANSWER: If every road were smooth as glass, your design might be good. But, because tires bump along the road, your alarm is worthless.

This design is simple enough to set up and test. Why not do that? Then run the car along dirt roads, open spaces, across railroad tracks and wooden bridges. Chances are that your signal will be registering every few seconds.

Chain Mowing Machine

Percy F. Hunt of Winlock, Wash., thinks he has developed a chain cutting-mechanism to replace the arm and cutter bar of the popular mowing machine. He hopes to get greater economy of power and material.

ANSWER: We know of no chain system as simple to maintain in operation as the arm and cutter bar. It's unlikely that the production cost of your design will be as low as the oscillating bar. And it probably won't cut as well.

Your idea of placing cutting blades on chains is not a new one. All chain saws are constructed in this way. However, in such saws the blades do not pass close to a stationary cutting face.

In our opinion the idea is not good. Manufacturing costs will be too great if you hope to produce a unit giving results that compare favorably with devices used today.

Auto Traction Device

M. H. Baugh of Falls Church, Vt., has invented a traction device that can be attached to the wheel of an automobile. This makes it possible to pull out of mud, snow and sand.

ANSWER: We are inclined to be a bit skeptical about its operation. If this sort of mechanism were intended for a hard rim it might work with some degree of satisfaction. But auto tires are resilient. This means that the part of the tire which rests against the road will be distorted and most likely throw the entire unit off the wheel.

We recommend that you have a model made

[*Continued on page 26*]

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Your Invention Clinic

[*Continued from page 24*]

and give it a thorough test. Redesign and make the unit more versatile as to tire and wheel sizes. Compare it with the many traction devices already available; they may very well prove better in regard to cost and operation.

Motor-Generator Combination

Wilfred McDonald of Alexandria, Ont. Canada, says that he knows you can't couple a motor to a dynamo, feed the current to the motor again and expect it to run. But he wants to know why.

ANSWER: You are absolutely correct—the system will not work and has been tried many times.

No mechanism will give as much power as is put into it, even discounting friction. A small motor is only about 80 per cent efficient. That is, for every 100 hp of electrical energy put in, you can get only 80 hp of mechanical energy out of it.

Similarly, a small generator is only about 80 per cent efficient. However, this rule may be modified in future atomic energy efforts.

Automobile Molding

Glen C. Oden of Carlsbad, N. M., asks several questions concerning negotiations about a new style of molding for use on autos.

ANSWER: The material from which the molding is to be made is strictly a manufacturers' decision and probably could not be incorporated in any claims. You have taken the proper first step—a search to determine patentability. We will be surprised if you get a favorable report. A patent, if granted, will probably allow use on all makes of cars without repeated protection on minor modifications.

How the units are to be sold is a matter for the manufacturer to decide. If he can make more money selling them by the piece instead of by the pair, he undoubtedly will set up his program to do just that. The only things with which you need concern yourself are the amount of money you'd get over a period of years, the minimum guarantee and your course of action if the manufacturer does not produce and sell.

You should consult an attorney about all of the points outlined here and in my personal letter.

Dancing Toy

P. J. McCartan of Bayside, N. Y., inquires about a modification of the dancing-man toy.

[*Continued on page 28*]

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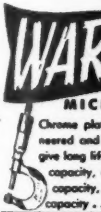

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Your Invention Clinic

[*Continued from page 26*]

ANSWER: Certainly, your figure could be made of plastic. But can you justify the cost of molds for the production? Often it is cheaper to make the article of wood than to cover the much greater cost of plastics and molding operations.

Have a search made to determine if the item seems patentable. Then, you'd better look into the possibilities of production and sale before spending money on the patent.

Remember that this is a novelty which the public must accept before it can make a profit for you. Don't take the current interest of a few children as a measure of its continued popularity.

What chances will you have with your product if you make it popular and the cheap, wood item reappears to cut into your sales? We recommend a more careful evaluation of all factors before going ahead.

Easy-Opening Bottle Cap

Kenneth Rosenberger of Tucson, Ariz., sends a design for a bottle cap with a tab for finger operated removal.

ANSWER: There are dozens of similar units in the records of the Patent Office, but few are found on the market. They're impractical.

Your construction uses more metal, will not work as well in capping machinery, is likely to damage tender fingers and is more costly than the present style of cap. It is heavier and demands more storage space.

After all, a new cap does nothing to the contents of the bottle. The only chance of success is to produce an article which will be cheaper to produce, apply and will do the job better. This would justify the substitution of your cap for conventional styles.

Self-Sealing Toothpaste Top

Howard Thompson of Hamilton, Ont. Canada, sends diagrams for a self-sealing cap for toothpaste tubes.

ANSWER: We cannot see how you expect to get your cap to function. There is an inviolable rule in physics which holds that pressure applied to a liquid in a closed container is equal in all directions. The paste can be considered to be a liquid. When the tube is squeezed, the pressure on the paste will press the ball against the opening with the same force as it tends to escape under the ball. But the ball already is held against the opening by a spring. The net result will be that the ball will seal

the opening more effectively and none of the contents will be squeezed out.

By changing the position of the ball, the result you desire could be obtained. Even this plan is not good because too much paste would be left behind in the vicinity of the orifice.

Costs also are against it. Modification of the design would bring them lower. But as the article stands now it is not likely that its production cost would be less than five cents. This means that the cap must be sold for 25 cents if you expect to make a profit. However, this is approximately the price of the paste, tube, box, machinery, handlers, advertising, dealer and jobber profit, salaries and stockholders' interest shares. So the article does not present a rosy picture. Forget it.

Utility Outlet

Harold Wright of Benton Harbor, Mich., says his attorney feels his design for a utility outlet is patentable.

ANSWER: The report surprises us. Perhaps the attorney saw something in the design which you did not disclose to us. Many switches with utility outlets are available. Some of the better ones also have a pilot light to indicate when the outlet is hot.

The articles have been available for many years. It's of little concern to the manufacturer where they are used. For this reason we doubt that you would be able to locate a manufacturer for a product with a similar purpose. But the special purpose you have and the interconnections might make the item useful for the equipment with which these utility outlets are to be fitted. We recommend a *thorough* investigation of available outlets before proceeding further.

Convertible Bicycle

Pirl Combs of Dayton, Ohio, submits a plan for a bicycle which can be converted quickly from the boy's style to the girl's model.

ANSWER: We have never been able to find a good reason for the difference between the two styles of bicycle, unless it is that manufacturers sell more cycles this way. Either sex can ride the bikes intended for the other. Motorcycles do not come in the sex-modification styles.

Investigation will reveal that many patents have been granted on the combinations, yet no manufacturer is disposed toward making them. Protection should be attempted only if you feel positive that you could sell the invention after the patent is issued.

[Continued on page 32]

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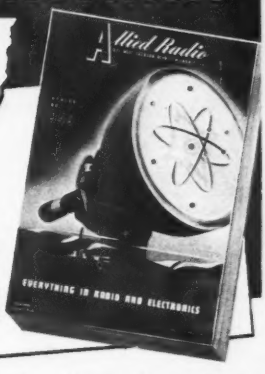

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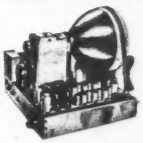

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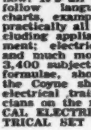

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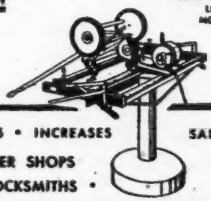

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Your Invention Clinic

[*Continued from page* 29]

Magnetic Motor

Jay Morris of Danville, Va., asks about a magnetic motor, perpetual-motion variety.

ANSWER: You should study the book Perpetual Motion by Percy Verrance. This contains many designs of so-called magnetic motors which were built but never worked.

If inventors gave even the slightest thought to proper evaluation of the forces acting in magnetic schemes, they would learn of their mistakes before attempting a model. The reason none of these devices work is rather simple. It takes just as much power to remove a piece of metal from a magnet or to move one magnet with relation to the other as the same two units produce during their attractive phase of the cycle.

This scientific fact applies whether the magnets are used for attraction or repulsion, whether they are fixed, used as rotating mechanisms or as swinging pieces, and whether they are in the form of a single pair or several thousands. The result is always the same. The units remain at a standstill.

[*Continued on page* 35]

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Your Invention Clinic

[*Continued from page* 32]

New Spark Plug

Charles Fein of Chicago sends a diagram of a spark-plug electrode. He tested it on a workbench and thinks he has invented a better spark plug.

ANSWER: Your system for automatic variation isn't practical. A spark usually takes the shortest path. In your design you have the equivalent of a short gap. It will never work like a normal gap.

A booster will do everything you want your plug to do without any basic change in the electrodes.

Remember, many forms of electrodes have been protected but have never found a successful sale. You must prove the superiority of any new design in actual practice after thorough scientific tests. Better forget your present design. It is based on a false premise.

Thermostatic Faucet

Robert T. Corl of Richmond, Calif., wants to know if he should go ahead with a thermostatic faucet he has designed. He hopes his faucet can be preset to mix hot and cold water so that you can always have the temperature you want right on tap.

ANSWER: When, and if, you can actually produce a thermostatic unit that will respond instantly to changes in temperature, further experiments in designing a mixing faucet may be worthwhile.

We have been called to task on our comments about thermostatically controlled mixing faucets. Inventors and manufacturers say that their particular design is the only valve which will do the work. Our original statement still holds. We have *never* seen a mixing valve that will assure a constant temperature.

Here's the reason for our skepticism: Thermostatical elements require a certain period of time to change position. This is doubly true if the element is heavy enough to effect control of a valve. If the main control element is delicate, then secondary electrical controls might operate at greater speeds and to better advantage.

You might turn on a cold-water faucet in the kitchen while someone is in the shower. Before the thermostat has a chance to act, the person in the shower might be scalded. Or, if you turn on the hot-water faucet in the kitchen, a cold spray may come out in the shower. This would throw the thermostat over to release more hot water. Then, when

[*Continued on page* 39]

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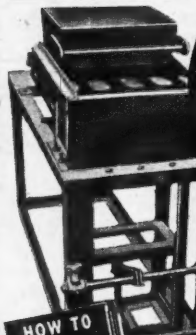

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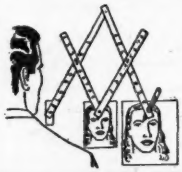

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Your Invention Clinic

[*Continued from page* 35]

you turn off the kitchen hot water, a scalding spray may shoot out in the shower before the thermostat could respond.

There's a definite demand for a perfect thermostat. You could fit such a temperature control to mixing valves and all sorts of other home and technical equipment. Whoever invents that perfect valve should be able to write his own financial ticket. But your present design is worthless because you have based it on slow working bimetallic elements.

Burglarproof Latch

B. B. Warner of Savanna, Okla., inquires about a burglarproof latch for windows and doors.

ANSWER: You have evaluated the advantages of your proposed latch but failed to include diagrams. We might not agree that your article is as good as you think it is.

If you can prove that the article is everything you say it is, and can produce it at the price you estimate, ask your attorney to search the records to see whether there is any hope of patenting the article.

Then make up several models. Attach them to windows and doors and ask some of your friends to try to get by them. Give them a good chance to study the arrangement—just as a burglar would do.

Bear in mind that no lock was ever made which could not be forcibly opened. That includes your latch, too.

Car Cooler

Jack L. Field, Jr., of Fort Worth, Tex., sends a sketch of a system for cooling (air conditioning) the interior of an auto.

ANSWER: The best way to cool a car would be to use a unit that any mechanic can put into an auto as easily as he can install a radio set. Though there are many advantages to your cooling system, it would take both a mechanic and a refrigeration expert to install such a cooler. Servicing would be expensive, too. You would also find it impossible to install your cooler in some modern cars because of lack of proper space for the parts you need.

Unless you can come up with a unit installation, we would advise you not to waste any more time on your cooler.

Your system would require that the conditioner be installed while the car is being built—and it would be extremely difficult to convince any auto manufacturer to make an expensive cooler standard equipment in his car.

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Editor's Workbench

[*Continued from page* 18]

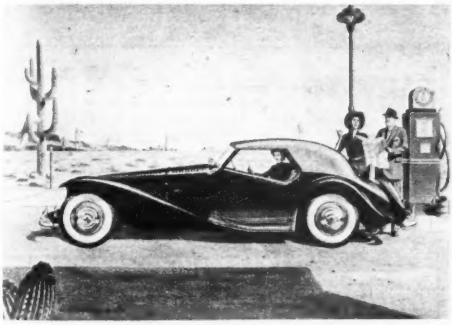
About That Dream Car

Dear Editor:

Your article McCahill Builds His Dream Car, in the January issue (see cut) was a lulu. As an all-around observer of the automotive buggy, I rise to applaud your sentiments.

In view of our present knowledge, the current models of automobiles should be marvels of performance and durability compared with the cars of, say, 1932. Yet I have a '32 Auburn which has gone 150,000 miles with one engine overhaul and in several ways is superior to the average 1949 model. It holds the road better, is more solidly built, more accessible and even the window channels have remained in good condition.

Since the old days, cars have grown quieter and prettier—but how about ruggedness and accessibility?



Looking at the stripped chassis of a new car the other day, I saw a wide, pressed-steel slab shielding the front third of the oil pan. I wondered how I could ever get at the forward mains and the con-rods. Many of the new cars seem to be designed to make the engines inaccessible by older standards. You'd have to be a contortionist to get at the valve mechanisms on some of them.

The late models are planned by specialists in differential calculus who care nothing about economy of operation, practicality or parking problems.

Maybe the manufacturers of cars, like movie producers, will retort that they are giving the public what it wants. Maybe they base their policies on some kind of Gallup poll. But the people I know don't like their offerings. And the sentiment in that direction is growing more pronounced.

When the owners of new models discover

[*Continued on page* 45]

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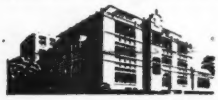

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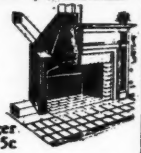

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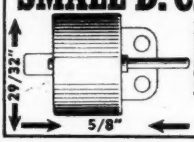

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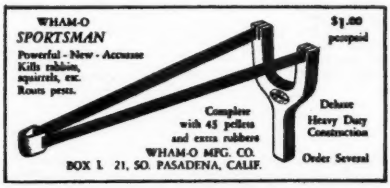

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FREE Demonstrator Offer. Mail Coupon

I've been in Direct Selling a long time. In my day, I've run across some terrific money-makers. But believe me, for quick and spectacular and steady profits, I've never seen the equal of ROTO-CLEAN! Pollack worked just 4 Hours and made $64.40 profit for himself.

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I'm not trying to sell you a bill of goods. In this ad, I'm not trying to sell you anything. All I want you to do is let me send you the facts so you can see for yourself. To prove I mean business, I even send real salesmen a sample ROTO-CLEAN without a penny of cost, as explained in my Special Offer to new men.

Don't send a cent. But rush the coupon. This simple step may give you the biggest, quickest cash clean-up of your life. Mail coupon now to

L. E. Patterson,
MAXILUME CO., Dept. X-104,
125 W. Hubbard St., Chicago 10, Ill.

L. E. Patterson, Maxilume Co., Dept. X-104
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Rush complete information about ROTO-CLEAN and FREE SAMPLE Offer to new men.

Name.....

Address.....

City.....Zone.....State.....

Editor's Workbench

[*Continued from page* 41]

that it costs $100 to replace two fenders, $400 to enlarge their garages so they can house the crates and then find out that the car won't even pull the family trailer to the mountains like the old bus—they're not going to like it!

I am sure that if some radical manufacturer would put out a car something like McCahill's Dream Car and then leave it that way, he'd find an eager market.

Why can't some enterprising manufacturer submit a questionnaire to motor editors, independent auto engineers and other experts, calling for their ideas and then base his product on the general consensus of opinion? I'd like to see the questionnaire followed by a bull-session convention where some of the disputed points could be thrashed out in town meeting manner.

Wouldn't this plan also be a great publicity stunt for launching a new model?

I really believe that such a method would result in what the public wants.

What do you think?

G. M. Bumpus
Romona, Cal.

Sounds like a fine idea to us. What do the rest of MI's readers think?

More From Our Ex-POW

Dear Editor:

You published a request of mine in the December issue of your splendid magazine for a grand surprise and entertainment in the form of old copies of MECHANIX ILLUSTRATED. I began at once to receive magazines and letters from new friends whom I had never known before. I feel deeply obliged to you.

As I have already received five subscriptions to your magazine, I would like to have your advice. Do you find it appropriate for me to return some subscriptions? Otherwise, I can give this surplus number to camp libraries here—one D.P., two refugee and the hospital. I can mark each copy as a gift from an American as a contribution to better understanding.

Please let me know at your earliest convenience.

Hans Schlegner
20a Wolfsburg
E. Lager 13/3, Germany

Because we felt certain that the kind readers who sent the subscriptions to ex-POW Schlegner would agree with us, we advised him to turn the extra copies over to the libraries. And once again we have been amazed at the rapid and heartwarming response of MI readers.

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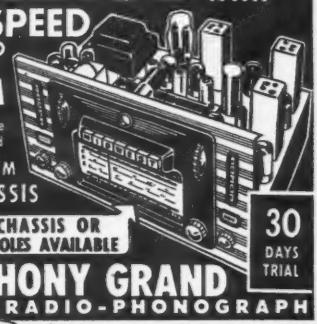
MIDWEST RADIOS with
DUAL-SPEED RECORD PLAYER
EASY TERMS
Powerful Series 16 5 Wave Band AM-FM CHASSIS
SEPARATE CHASSIS OR COMPLETE CONSOLES AVAILABLE
30 DAYS TRIAL
SYMPHONY GRAND
AM-FM RADIO-PHONOGRAPH



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CITY _____ ZONE ____ STATE ____

Bring Electrical Troubles "TO LIGHT" with
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The NEON glow enables breaks, poor contacts, shorts, and defective electrical units to be located quickly in all circuits of 100 to 550 volts . . . indicates hot or grounded wires . . . tells AC from DC (and polarity).

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198 Central Ave. Newark, N. J.

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MECHANIX ILLUSTRATED

PLANS CATALOG

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Your advertisement can reach this mail-buying audience of nearly 2 million readers for only 50c per word . . . payable in advance . . . minimum 10 words. Copy to be inserted in June issue must be in the office April 4th. Mail to MECHANIX ILLUSTRATED, 67 W. 44th St., New York 18, N. Y.
Word count: Zone number free. Figure one word: Name of state (New Jersey); name of city (New York); sets of characters as in key (14-D); also abbreviations as 35MM, 8x10, A.D. A.C.

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EXTRA SPECIAL! 1000 Names, Addresses, Songwriters—$1.00. Popular Advertising Company, Box 927, Atlanta, Ga.

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24 WORDS IN 50 Weeklies, $4.96. J. Darnell, 730 Hays, Jackson, Tenn.

AGENTS WANTED

FREE NYLONS given if Kendex hosiery runs or snags! World's only women's hosiery sold with written guarantee amazing everybody. Mere words could not express unbelievable money making opportunity. Fantastic earnings become reality. Armstrong earned $202 in 9 days. Watkins sent 92 orders in one day. Imagine replacing hosiery free regardless of cause—whether use or abuse! Truly sales dynamite for terrific profits. Even if you never sold before, three magic words: "Guaranteed Against Everything" will open doors for you—make women listen and pour money in your pocket. Complete line from sheerest to service (15-20-30-40-60 denier) all lengths 28 to 35 inches—latest colors—seamed full fashioned and seamless. No competition because Kendex guaranteed nylons not sold in stores. Also complete line men's hosiery actually guaranteed for one full year! Nothing like this anywhere. Includes rayon, nylon, lisle, wool, cotton, mixtures, etc. All styles, patterns, colors, prices to please everybody. Thousands shipped daily. 100,000 pairs constantly in stock for fast delivery. Over 30 years in business. You need no money or experience. Nothing to pay now or later. Show free outfits. Write orders. We deliver and collect. Big advance cash plus huge bonus. Earn money spare or full time—exclusively or side line. No restrictions. Become manager—appoint others to sell for you—earn steady income on their sales. Complete money-making outfits including salesbooks in color, samples of hosiery materials, etc., furnished free and prepaid. Simply mail name and address to: Kendex Company, Babylon 127, N. Y.

LOOK! SPECIAL money-making opportunity! Profits to 100%. Bonus. Sell irresistible All-Occasion greeting card assortments, new style gift wrappings, plastic cards, exclusive stationery. Special offers. Request free Name Imprinted and Floral Stationery samples and All-Occasion boxes on approval. New England Art Publishers, North Abington, 310, Mass.

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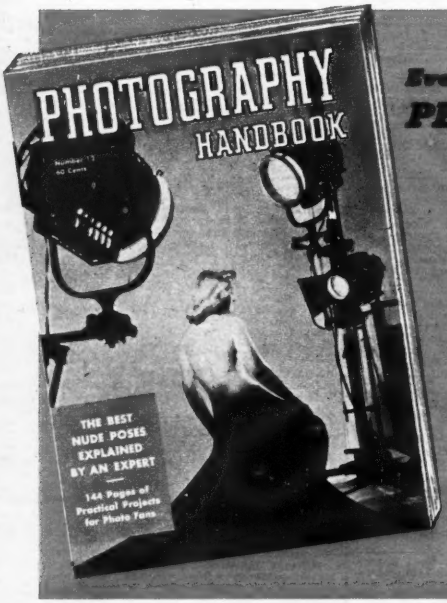

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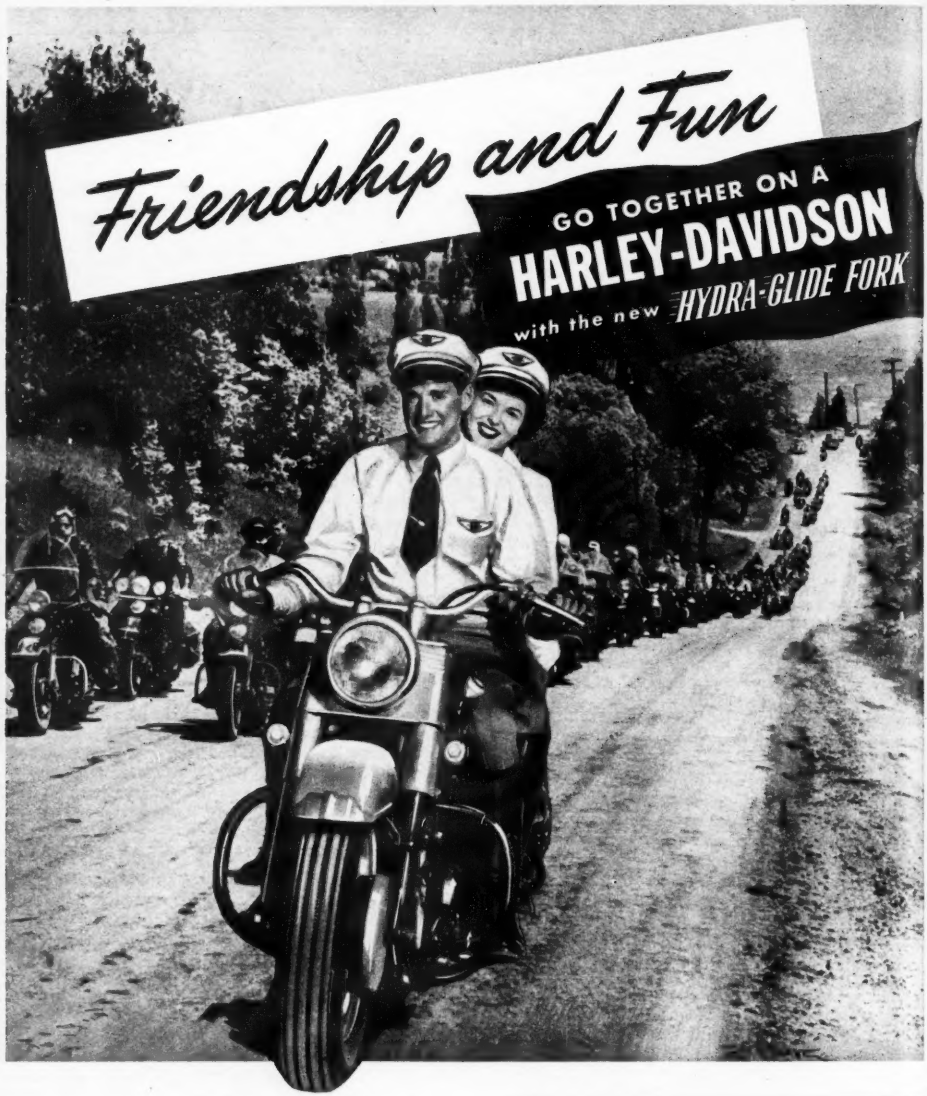

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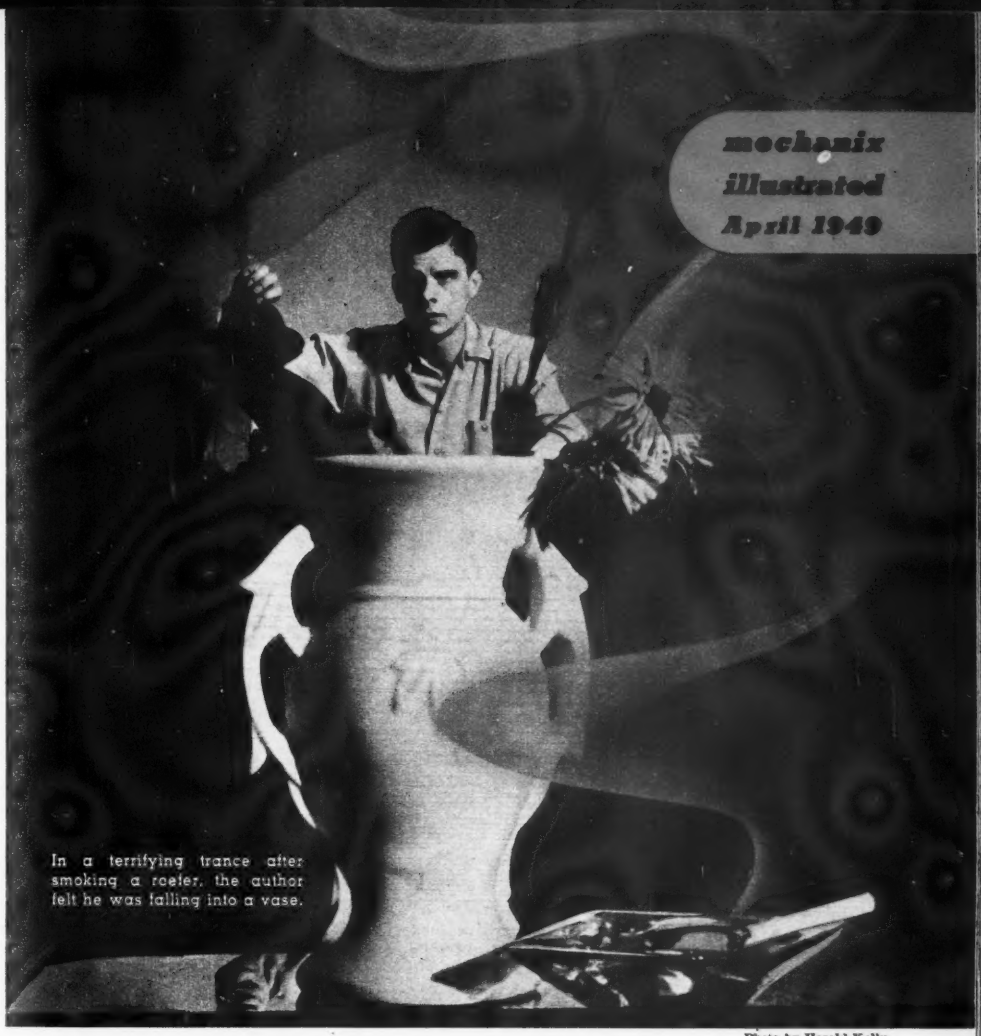


In a terrifying trance after smoking a reefer, the author felt he was falling into a vase.

Photo by Harold Kelly

You'll get a kick if you try a reefer—but not the kind you expect, a "tea" slave warns in exposing startling secrets of dope-den life.

Exploding the Myths About MARIJUANA

Anonymous

I'M scared—plenty scared. Not so much for myself but for the kids of school age. Ever since the Robert Mitchum scandal in Hollywood set the country talking, the myths about marijuana have been mushrooming—dangerous myths.

I'm scared for the young boys and girls who want to try a reefer or two "just for the kick." I'm scared because some people are saying marijuana is a harmless drug, marijuana is not habit-

forming, marijuana damages neither mind nor body.

Marijuana *is* bad, insidiously bad. It grabs you tight, then slowly turns you into a slave. It pounces on your mental or physical weak points and drags you relentlessly down into disgrace.

I know—*I smoke marijuana.* I've been a slave to reefers ever since I was 16. Twenty-one years of marijuana "muggling" has taken a heavy toll on my health and shattered my nerves. I find release from my mental anguish only when I lose myself in a reefer trance.

I fell victim to marijuana while I was going to school in a tough New York neighborhood. One day when a group of us kids was hanging around near the candy store a smooth-talking stranger urged us to try one of his special "muggles."

"What can you lose?" we argued. "Sure, mister, we'll try it."

That dope salesman kept after us. Soon he had us as regular customers—and marijuana had another batch of young slaves.

Now my companions are no longer young in health or heart but we must keep seeking solace in dope dens until we're finally trapped—and thrown into jail or the madhouse.

To show you the life I've had to lead as a reefer addict, I'm going to take you behind the scenes into one of the marijuana dens I frequent. . . .

Five of us marijuana smokers are sitting in easy chairs in a small room. There are heavy draperies on the walls and the windows are tightly closed. The odor of Chinese incense is strong—to heighten the exotic effect. The only light is a dim one in the corner. Glare disturbs us when we're high.

This is a "tea pad," a private apartment where we smokers meet several times a week to "get loaded."

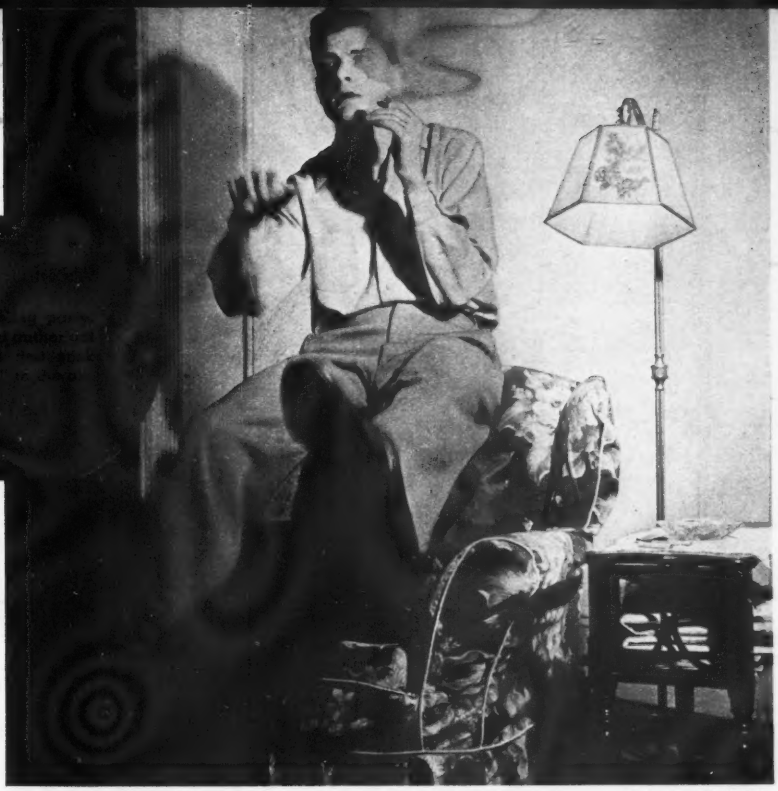
I light up.

My lips hold the cigaret loosely, leaving space to draw in as much air as possible with the smoke. You get higher quicker when smoke and air mix in your lungs.

This first puff is always bitter, like stale tobacco. There is a pungent odor, as of strong tea—hence the nickname. I want to retch, but I keep the smoke in my lungs as long as possible. Then I exhale slowly. It takes 20 minutes to finish the first stick.

I start to feel it. A soft languor envelops me. I'm beginning to float. My troubles are left behind as I rise from my easy chair beyond their clutch.

I smoke a second reefer. Now I get a feeling of supreme [*Continued on page* 151]



Photos by Harold Kelly

WELCOME to A.O.C. school. Candidate Oren De Haven of South Haven, Mich., arrives at Fort Riley.

FALL IN! De Haven (third from right) is quickly put into formation with other civilian and army candidates. Below, Oren samples Army chow for the first time and looks as if he's enjoying it.

How to ENLIST at the TOP

YOU'RE walking down the street and a big-business man stops you. "How'd you like to join my organization as a junior executive?" he asks.

"Executive of what?" you probably say.

"Whatever type of business you prefer," he answers. "I need executives who can run a railroad, a truck line and a radio network. I have some good spots open for engineering executives and more top jobs in personnel, foreign relations, motion pictures, aviation, science, purchasing—you name it and I have the job for you!"

"But I have no experience," you start to protest.

"Oh, that's all right," he interrupts. "I'll give you six months of training, with free room, board, medical care—and $115 a month to boot."

Would a conversation like that interest you?

It probably would—and you can get in touch with that gentleman any time you want. He's your nearest Army recruiting officer and the offer he's making seems so unusual that the editors of MI sent me to check on it.

In brief, the offer is that you, a civilian, can now join the Army as a full-fledged officer. This is quite an offer—as many GI's who spent years in the ranks without a chance at officer's training will assure you.

My first stop on the MECHANIX

Like to make the jump from civilian to officer in one step? MI's editors listened unbelievingly to Army ads and then sent their correspondent to check. Here's the inside story he brought back from Fort Riley.

By George Scullin

Photos by David Robbins

ILLUSTRATED investigation was Washington, D. C.—the Pentagon Building. There, I learned that the program is open to all men, married or single, between the ages of 19 and 28. You must have a high school education or its equivalent and be able to pass an intelligence screening test.

I was determined that first I would check on one aspect of the program that had bothered me. A recent ruling prohibits the return to civilian life of officer candidates who fail to pass the course. If this program is not simply a ruse to get quality enlistments, why keep the unsuccessful candidates in uniform if they are unwilling? Especially since you must enlist for a three-year term in order to be accepted. That was the question I asked.

It keeps you on the ball, they told me. You can't just drop the course and return home as your only alternative to staying in school is to go into the ranks as a private. While this looks like a rough ruling, a couple of candidates told me that it is a life-saver. After four months of classes, field work, physical training and drill they were fed up. It was at this point that some of their civilian predecessors had washed out in favor of home and family. Faced with three years of training in the ranks, these boys kept plugging in school. And now, with lieutenant's bars on their shoulders, they are glad they were forced to stay at it. However, many wary individuals will probably still look upon this ruling as a definite drawback.

A big topic of conversation around

the Pentagon Building is the new school itself. Located near Fort Riley, Kansas, it represents all that the Army has learned in the training of officers. Before starting the school, the old Officer Candidate School of World War II was put under scientific observation. It was probed, psychoanalyzed and subjected to surgery. Many courses with no more to back them than military tradition were eliminated. Technical courses that had been mere introductions to the subject matter were expanded to mean something. Biggest changes as the result of the scientific survey came in the bolstering of courses in applied psychology, personnel administration, self-appraisal and etiquette. The old phrase—"an officer and a gentleman"—was dusted off and given new significance.

Instead of the old O.C.S. 90 days of training, the new A.O.C. (Army Officer Candidate) school lasts six months. And instead of having several schools scattered around the country, the Army has just one. Besides training civilians, the school also trains candidates selected from the ranks. The first few classes were drawn largely from the ranks. Now, the need for officers has become so acute that civilian sources must be tapped. Since January, a class of more than 200 has entered A.O.C. every three weeks. By now civilians comprise about 50 per cent of each class.

When you are finally accepted

for the new school you do not report until there is a definite place for you. Then you are given two months of basic training at Fort Riley so you can compete on an even basis with classmates who have had previous military experience. During this basic training you receive the pay of a sergeant —$115 a month. This is the same pay check you draw during your six months as a candidate. The rank of sergeant is yours from the time you report for basic until you graduate as an officer. Men from the ranks are also sergeants while in school—but all are addressed as "Candidate." Enlisted men who fail the course revert to the rank previously held.

After hearing about this wonder school, I flew out there in order to give you a first-hand report. Fort Riley is as beautiful a post as there is to be found in the country. It has an air of comfort and security that gives the officer candidate something to look forward to.

But look forward, he must. This solid comfort is not to be his during A.O.C. The school itself is located at Camp Forsyth, a war-built training adjunct to Riley, located on the treeless flats of the Republican River, a mile from the main post. The barracks, mess halls, classrooms and administration buildings are examples of the type of wooden structures rushed together during the war.

If you are typical of the candidates [*Continued on page* 153]

Harvey Earl, GM's style chief, poses with his rear-engine Corsair.

General Motors' Rear-Engine Car

By Bernard W. Crandell

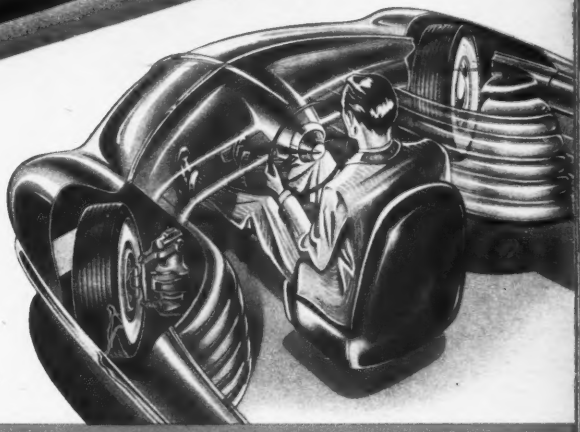
WHENEVER the subject of rear-engine cars plays across the auto columns of the nation's newspapers, a certain bunch of boys in Detroit snicker to themselves!

Rear-engine cars! Not for the American public, they say. And they ought to know. They're the head stylists and engineers for General Motors Corporation. Why are they so convinced?

They know this rear-engine stuff isn't new at all. In 1902, 18 out of the 23 automobiles in production had their engines placed aft. But then gradually the engineers were overcome with violent symptoms of *front-engine* fever. They wanted to put the motors up front! And they said they had good reasons for doing so.

Safety was one of these reasons and better weight distribution another. They got their way eventually and soon almost all American cars were being manufactured with engines in the front. But then the picture started to reverse itself. In 1925, the Julian chugged into print with "the first rear-engine car in 20 years." Entirely unsatisfactory and "old-fashioned," it shortly thereafter became the first rear-engine model to go *off* the market in 20 years, too.

In 1931, Sir Dennistoun Burney, noted airship designer, had a go at a rear-engine car. He tried to peddle it to GM and Studebaker on the theory that its 66-33 weight distribution (66% of the weight on the back wheels and 33% on the front) would, when the breaks were applied, shift to a 50-50 balance. He also thought his machine took the bumps easier with front-wheel shocks rotating in an arc from the rear axle, and bumps under the back wheels being absorbed by a rotation around the front axle.



The sleek Corsair, shown above and on MI's cover, was built to test the merits of moving the modern auto's motor from the front to the spot usually occupied by the baggage compartment. The cutaway drawing at the right shows the big drawback in this revolutionary design—the narrow seat up front. Turning space for the wheels allows room for only driver.

MI reveals the exclusive story behind the mysterious stern-powered GM auto—and tells why you can't buy one today.

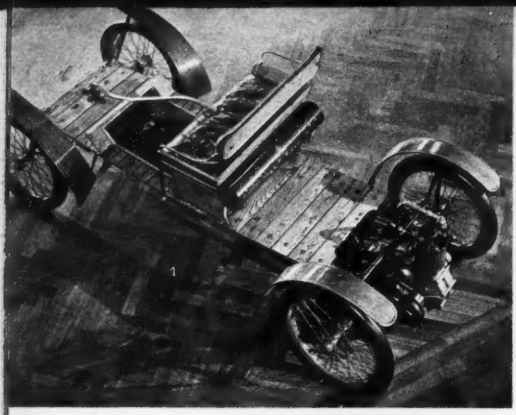
If this sounds screwy, it's typical of some of the inspired double-talk that has been going on ever since the revival of the rear-engine ruckus.

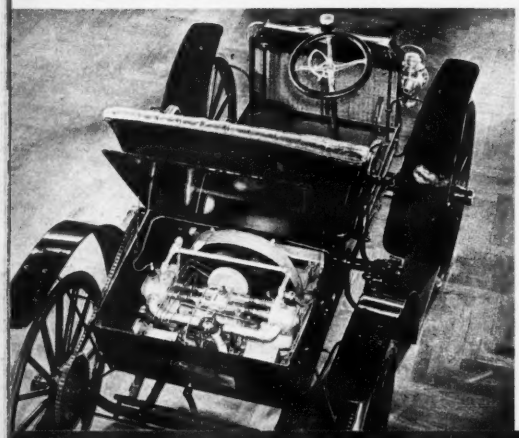
The Burney design, which went whole-hog on radiators with one in back to cool the engine and another in front to heat passengers, was sold eventually to the British Crosley. They came out with a $3000 sedan which set no sales records.

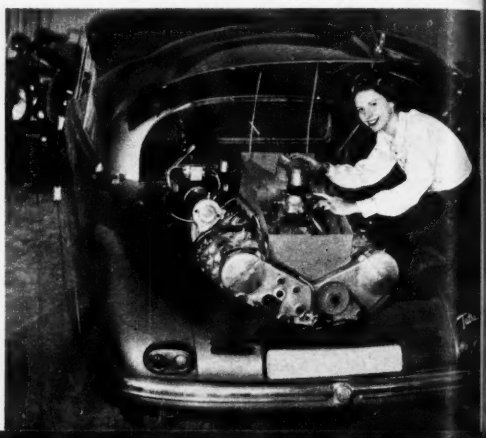
An experimental rear-engine design made its appearance in 1933. John Tjaarda, a Detroiter who designed two experimental models for the Briggs Manufacturing Company, claimed it was ridiculously simple to drive. He explained in the magazine Automobile Topics: "When starting, all one has to do is turn on the ignition, when a red light will show on the dash. Then step on the throttle which simultaneously starts the engine and the red light will go out and a green light shows. As the engine can not be heard in the front seat, the lights will tell what is happening in the rear."

Tjaarda's cars caused a mild sensation in the industry for a year or two. Then Chrysler and Ford, potential customers for whom Briggs already made bodies, had to decide whether the sensation was good or bad. The freaks had V-8 engines mounted over the rear axles and buzzed through the streets of Detroit without mishap until winter arrived. The original notion was that the engine heat could not seep forward and cause discomfort during hot weather. As it turned out, passengers were cool enough in summer, but during the winter they froze. No heating system had been devised!

Most unconventional and probably most comfortable of all interiors in a rear-engine experiment was brought out several years before World War II by William B. (Bill)







The Orient Buckboard, that racy number at the top of the page, was one of the first cars to feature rear-engine drive—back in 1903. The 1909 Schact, above, had an opposed-type motor like the Tucker.

The Czech Tatra, top, has three headlights out in front but no engine under that stubby hood. The smiling young lady shows where the Tatra's 75-hp V-type motor rides in the rear—as in our buses.

Stout. He first achieved engineering fame by building the first all-metal airplane. In 1934, Stout showed up with a living-room on wheels. There were broad back seats, three chairs which could be moved around and a comfortable chair for the driver. A drop-down bed and a table completed the ensemble. Stout planned to build 100 of these cars the following year. Instead of launching production, however, he refined the job into a newer model called the Scarab. It got a good press but never got any farther down a production line. One reason alone was enough to kill the idea—it would have had to sell for $5000.

In 1938, Emile E. C. Mathis, French motor manufacturer, and Axel Wenner-Gren, Swedish industrialist, announced plans to build in France, Sweden, England and the U. S. a small car with a radial engine in the rear. It would be "designed to give 50 to 60 miles on a gallon of gasoline." In this country they hoped to sell the car for $500 but the War interrupted their aspirations and the car never got into production.

Several other European pre-war designs for rear-engines—the English Crosley, the German Mercedes-Benz, Czech Tatra, Italian Isotta-Fraschini, French Renault and Hitler's Volkswagen—got along well enough by European standards. But that was principally because their size, speed and styling were so far under American par for the production line that major problems didn't develop. Most of the small cars with little horsepower couldn't go fast enough to get the front-end sway. Engine-cooling was of so little consideration that in the 8-hp Renault, for instance, the radiator was *behind* the engine.

Then, of course, came Tucker with his plans for a posterior-powered jalopy with more trunk space, more power, better vision, more safety, better brakes, better

See anything strange about that car at the top? It's a six-wheel Pontiac. Dual tires help carry the weight of the motor, set where the back seat used to be. That box, lower cut, hides the engine.

Man with flying hair, top, is W. B. Stout, who is testing aft-engined car he built of glass. The fabulous Tucker, above, gets its push from the 150-hp motor in the rear. Note the six exhausts.

styling, etc., at the same cost as a conventional auto. But production-line Tuckers still haven't made their appearance for genreal distribution and it looks like Tucker's dream won't come true (at this writing, anyway).

One day in 1946, an automobile that appeared to be an ordinary Pontiac sedan stopped at the New York mouth of the Holland Tunnel to pay the toll before proceeding to New Jersey. The attendant, casually preparing to charge the regular fare, let his gaze wander downward. He stopped short! The car had twice as many rear wheels as an ordinary private car. Like a bus, he thought. So he upped his fee to the bus category—a few cents more.

This special six-wheel rear-engine job, put together in New York for General Motors, has since been driven, dissected, patted, pooh-poohed and praised by scores of engineers.

Results? The tests kindled some enthusiasm. Its dual tires had unusually good traction on any kind of road surface. On snow, ice or gravel it performed better than others. It didn't "fishtail" on slippery surfaces while gathering speed. The light front end made steering easy, without the tires side-slipping on a sharp turn. But that's about where its advantages stopped.

What are some of the arguments against the rear-engine design? One of the principal ones is weight distribution. With the heavy motor over the rear axle, the center of gravity of the car is shifted to the rear. This means that when not under complete control, the car will have a tendency to turn around and travel backwards, like an arrow shot tail-first. When skidding on ice, for example. Then, too, in case of an accident, the heavy rear moves forward, telescoping the car and its occupants. Even the rear-engine boys [*Continued on page* 155]

A MONEY-MAKING

idea

He's a Rat Farmer

Yes, that's a real rat riding high and happy on the shoulder of Georgia McKinney, the rat farmer's wife.

A strange little livestock ranch in the attic gave Norton McKinney a new life and a $10,000 crop.

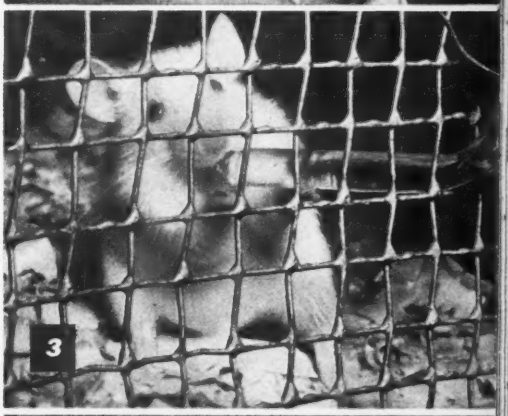
By William Gilman

"FUNNY kind of a business for a fellow to get into," the villagers shake their heads as they glance up at the old mansion Norton McKinney bought in quiet little Middletown Springs, Vermont.

And it *is* a funny setup, all right. The attic in his antiquated home swarms with rats—mice, too. Last time he took a census there were 1500 adult rats and mice, with new litters running up the rodent population practically every day. You'd think his wife Georgia would raise the roof about that ratty situation up in the attic—but, no, she only wants to hear *more* rats racing around over their heads. She even helps him nurse and coddle new-born rats with germ-free water and purify the air they breathe with ultra-violet lamps. No wonder their place is called Funny Farms!

For McKinney and his wife are running a new kind of livestock farm—and raising a fine flock of rats. Last year they harvested a $10,000 "crop" from their rat farm and they're expanding all the time. To meet the specialized medical demand for thoroughbred rats and mice, they are shipping more than 500 a week to leading laboratories. Soon they expect to make that figure a round thousand.

Science needs these testing animals to fight cancer, to test for pregnancy and venereal disease; to study dietary diseases like rickets, and to mobilize our health forces against germ warfare and atomic radiation. Some of his rats "stood in" for humans at the Bikini atom-bomb tests. Mice were used in developing the latest hope in the war on cancer—teropterin, which reduced [*Continued on page* 156]



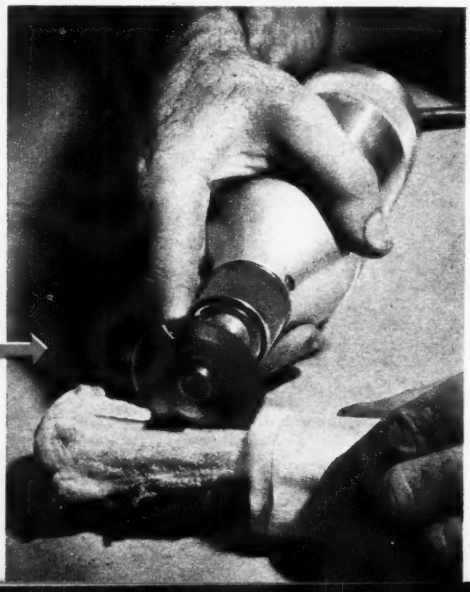
The only ratrace in McKinney's life now is the one at the top (Picture 1). Norton and his wife like to see Mother Rat enjoying her exercise in the treadmill he built. Picture 2 shows a Swiss-Albino mamd mouse and her babies; 3, a young Sherman rat swigging a drop at his water fountain, and 4, the "livestock" stalls up in the attic.

NEW in SCIENCE

Three-Way turntable plays all types of platters. It'll take both RCA and Columbia long-playing records as well as conventional ones. Scott Radio, Chicago.

Safety Umbrella provides you with 100 per cent visibility. You'll be able to see where you're going through their transparent Vinylite plastic tops. In kiddies' size, too. Eichenbaum Umbrella Co., New York.

Electric Bone Saw bites through anything rigid such as wood or bone. But it merely massages anything with "give" such as flesh or cloth. Its secret is an oscillating blade which vibrates in a ⅜-inch span. Zimmer Manufacturing Company, Warsaw, Indiana, is marketing it.



THIS MONTH'S

prize gadget

Sergeant Ellis lights up to show how simply his invention works. A cigaret from the self-loading pack, right, comes out of the dash with the heated lighter but doesn't burn till the smoker takes a puff.

Push-Puff Auto Lighter

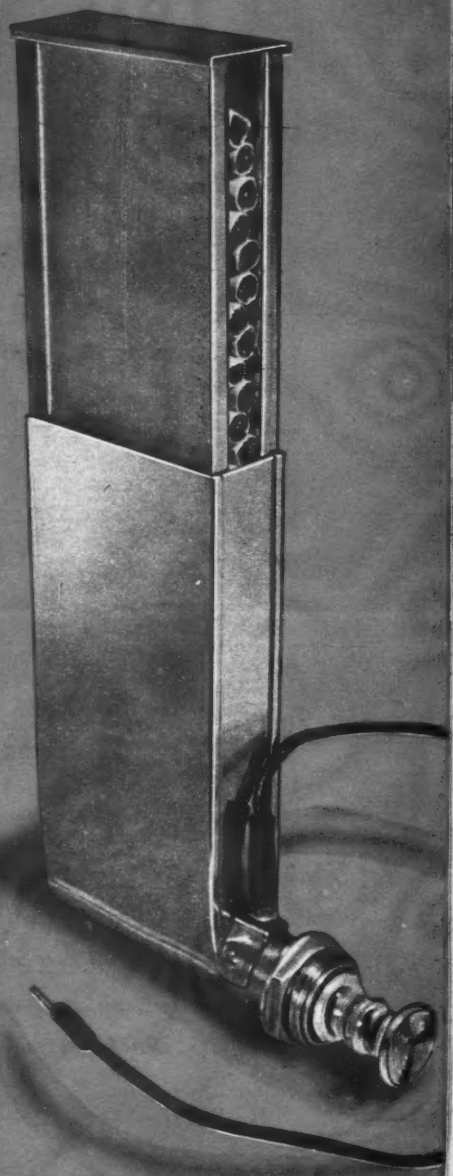
IF you want to find a Marine, look for trouble. There was no bloody beachhead or hot lead when Technical Sergeant Elra Ellis of the First Marine Aircraft Wing was rolling his car peacefully across the country last year. But suddenly he found himself in the thick of trouble. Lonely and bored with the long road, he had fished about in his pockets for a friendly smoke—only to glance up and see his car about to crash head-on into the autos in the opposite lane. He swerved sharply—just in time.

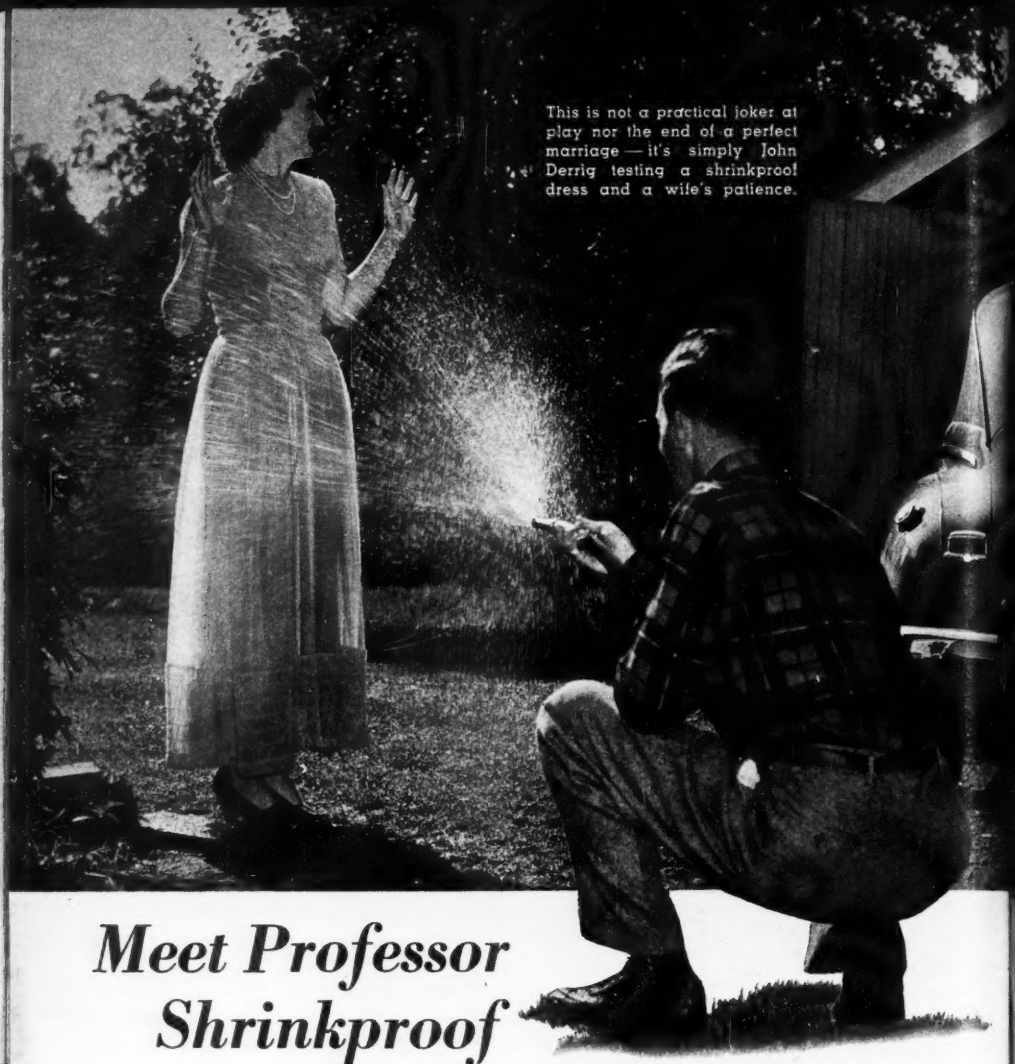
That near smash, though, made him decide to figure out a safe way for a driver to get a smoke. In true Marine tradition, he landed on the problem—and invented a novel push-puff auto lighter in his home workshop at Tustin, Calif. Fitted into the dash, the lighter automatically feeds its load of 20 cigarets down into "firing" position. When you push in the lighter, it cups the cigaret. Pull out the heated lighter, puff—and you're smoking the cigaret, without having to take your eye off the road.

For liquidating that auto lighter trouble with his prize gadget, MI is sending Sergeant Ellis a "well done" and a $50 greenback to decorate his wallet. •

WIN $50

Think you're a good gadgeteer? If you've dreamed up some neat new gimmick, get busy and work it out in your shop. Then send pictures and a detailed description of your invention to The Gadget Editor, MECHANIX ILLUSTRATED, 67 West 44th Street, New York 18, N. Y. Each month the best entry, in the opinion of MI's editors, will be awarded a cash prize of $50. Got any bright ideas?





This is not a practical joker at play nor the end of a perfect marriage — it's simply John Derrig testing a shrinkproof dress and a wife's patience.

Meet Professor Shrinkproof

John Derrig's home is his laboratory and his family the guinea pigs. They all take a beating so he can test fabrics the hard way.

By Wilfred Weiss

DOROTHY Derrig was coming down the walk in front of her house at Bound Brook, N. J., in an exquisite sheer-net party dress. Suddenly her husband John whipped around the corner with the garden hose, like a fireman who had overslept a three-alarmer. He squirted the full spray on his pretty wife and soaked that long, lovely gown from neck to hemline.

"It's just fine, John," she stood there and remarked sweetly—without making a move to dash back into the house and look up the nearest divorce lawyer in the classified phone book. "See, it hasn't lost a bit of its crispness! The water is rolling right off."

John beamed and turned off the jet from the hose nozzle. Then they strolled happily

guinea pigs for the Professor's fabric ideas —but they never rebel against this peculiar homework and are as eager as the Professor to find out how the product stands up after they put it through the wringer in these home-lab experiments.

In drenching his wife, John was testing something known as Sheerset finish for rayon, nylon and cotton net cloths. It got its start during World War II when the Army was looking for a way to make mosquito netting easy to dye but resistant to moisture and mildew and to keep it from turning into a soggy mess when it was washed.

Sheerset finish is the answer. It takes dye easily and stays crisp despite moisture. Also, the strands don't slip and bunch up during laundering. You can toss Sheerset curtains into the washer, for instance, then dry them on the line without using a stretcher. They'll dry evenly with no shrinking or sagging.

Professor Shrinkproof's wife accepts her guinea-pig role with understanding and good grace. And his two children, Diane, six, and Johnny, two, take it all with great glee. They believe they have the most unusual father in the world. Where else would you find a parent who has his son dressed in a fresh cotton suit and encourages him to flop down and scrape along the sidewalk?

To young Johnny, that's great fun. He's probably the only kid in America who gets an ice cream [*Continued on page* 159]

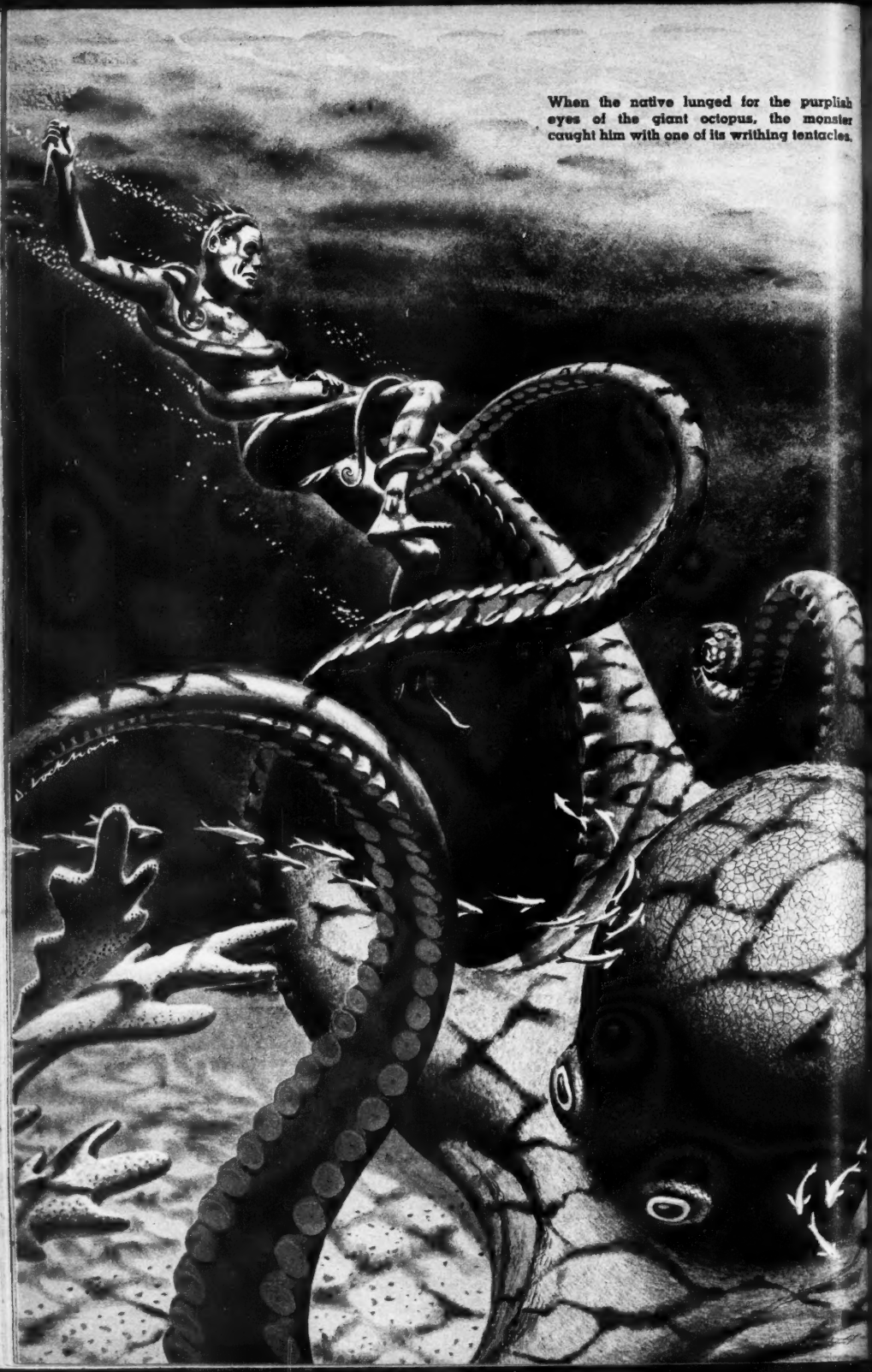
The kiddies (top of page) stomp on clothes that won't wrinkle—Derrig hopes! Above, he and his son are wearing the same size shirt. Junior is squeezed into the one that wasn't shrinkproof. Right, luckily for his daughter, ink rolls off a treated fabric.

around the house to spray some net curtains hanging on the wash line.

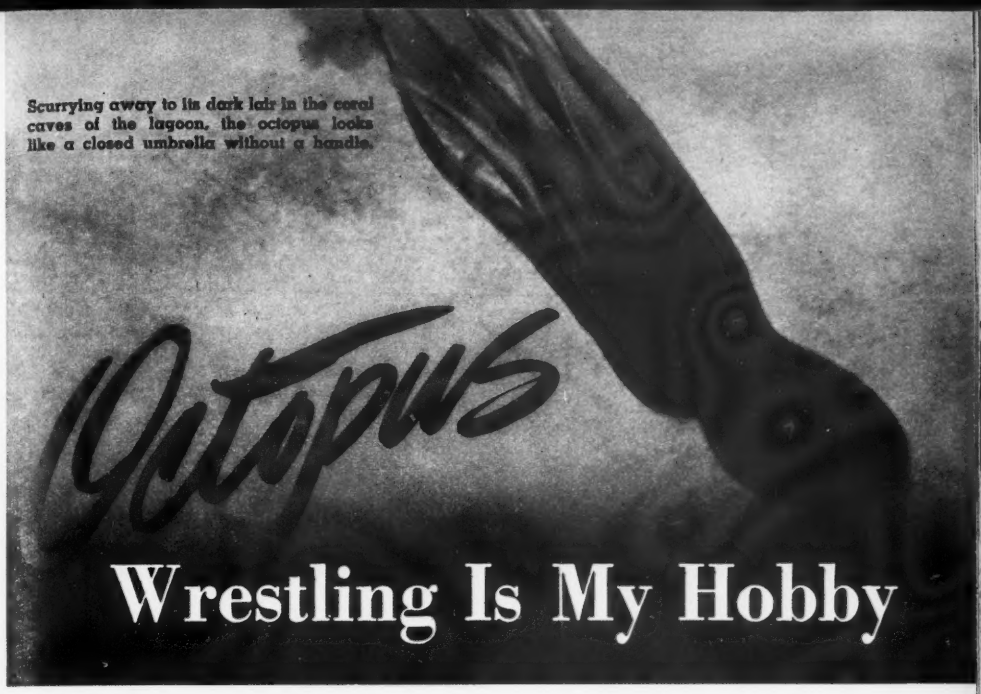
The neighbors still stare at such strange goings-on at the Derrig home. Luckily for John, though, they don't call a cop or the Humane Society when they see him turning the hose on his wife or slinging mud at his kids.

For the people next door know now that he's "Professor Shrinkproof," a respectable citizen who is merely trying out the results of his chemical research in fabrics for the American Cyanamid Company through practical "consumer" tests to see how some new product takes rough wear.

Almost every day his family serves as



When the native lunged for the purplish eyes of the giant octopus, the monster caught him with one of its writhing tentacles.



Scurrying away to its dark lair in the coral caves of the lagoon, the octopus looks like a closed umbrella without a handle.

Octopus Wrestling Is My Hobby

Here's a new kind of deep-sea fisherman—he stalks the cunning, eight-armed king-of-the-ocean in the coral lagoons of the Pacific.

By Wilmon Menard

"YOU have come to the right place, my son," said the old man. "On this atoll, the world's first octopuses were born—and will one day die, we pray!"

The wizened grandfather of my native guide greeted us with those words when we landed on the tropical beach at Rimaroa during our ocean-wide hunt for octopuses. For, as in ancient days, the Islanders still regard the giant octopus with awe.

They believe him to be the prowling ghost of the wicked god Tumuraifenua, who cast the natives into darkness by holding down the sky with his tentacles. According to the legend, sickness overwhelmed the population and slimy monsters crawled from the deep lagoons to devour entire villages. But for me, wrestling and killing the treacherous octopus was simply a hobby and I had crossed the Pacific to engage in this fascinating pastime.

The first thing I had done upon arriving in Tahiti was to make inquiries for a good octopus hunter. After a week of diligent search, I finally found the best native hunter on the island. His name was Roo—18 years old, handsome and garbed in a scarlet loincloth. In the shadows of the coral ledges on the seaward wall of the barrier reef, we went in search of the large *fes* (octopuses). Although a coward in the open, the octopus is a demon of fury when cornered. Roo and I always went in search of the devilish monster armed with strong *taveros* (spears), twelve feet long and barbed with shafts of iron.

It was difficult to spear the octopus if it were far back in the coral caverns. But Roo had his own system for drawing the creature out. Retreating a short distance from the lair, he would take up his *vivo* (flute) and play weird tunes upon it the way a Hindu fakir charms a cobra. His piping would soon attract the octopus from its cavern—first the globular, horned head, then the long tentacles with their double row of cup-like suckers. Out of curiosity the octopus would approach within striking distance. In a split second our spears would speed into the revolting mass.

Then, there would be a human-like moan and the water would be clouded with sepia. The long tentacles would flay the surface of the lagoon in savage fury, as the monster tried to rid itself of our spears which were

This bloated baby octopus will grow until its powerful tentacles are over 25-feet long.

firmly imbedded in its head. If necessary, another spear would be dispatched into the writhing hulk. It took a long time to tire the octopus and we had to hold firmly to the ropes attached to the end of the spears to prevent it from sinking to the bottom of the lagoon where it would be lost to us.

What did we do with the octopus after we killed it? We simply lashed it behind our outrigger canoe, towed it back to the village and presented it to the district chief. And what did the natives do with it? They ate it!

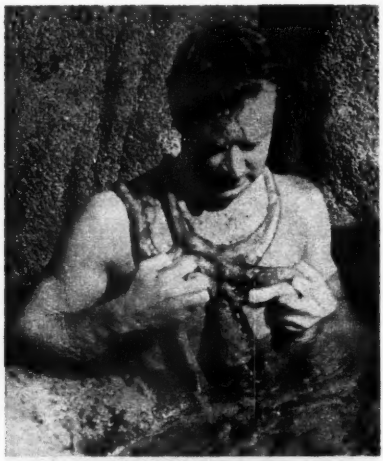
For a long time I could not bring myself to eat *fe* but one day I placed part of a tentacle in my mouth and became firmly convinced it is a marine delicacy. The tentacles, cubed and served with sauce made from their own juice, are delicious.

One day Roo ridiculed the size and ferocity of the octopuses of Tahiti. "You ought to see the size of the *fes* at my grandfather's coral atoll in the Paumotu Group," he said. My octopus-hunter's curiosity was up!

So, off we sailed in a trading schooner for the atoll of Rimaroa on the southern fringe of the Paumotu Group, northeast of Tahiti. Early one morning, after many days of sailing under a blazing tropical sun, I saw a faint haze on the horizon ahead. As we sailed toward it with a brisk wind filling our sails, it became more sharply defined. There's no sight that quickens my pulse like a lonely coral atoll rising from a deep blue sea. Through my binoculars, I could see the natives running to the beach and pushing off across the still lagoon in their outriggers.

A short time later, we were ashore and being greeted by Roo's grandfather and the 30 natives who lived happily on the remote atoll. The natives carried on only as much trading in pearl shell and copra as was necessary for the simplest life.

It didn't take us long to get down to octopus hunting. We started making a systematic search of the lagoon and the outer reefs. Extreme caution was maintained on these excursions for the calm lagoon abounded with danger in many ghastly forms. One moment I would be walking unsuspecting on a partly submerged reef stopping occasionally to inspect the coral wall for octopus lairs. Then a sharp cry from Roo would send me scrambling to a high part of the reef just in time to escape from a large *veri* (poisonous sea-centipede.) It's an ugly animal equipped with countless legs—a double-edged comb in appearance. A prick from any of its tines would be enough to make you very ill.



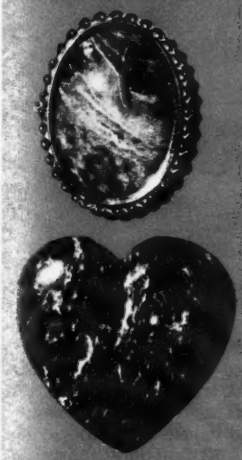
Octopus-wrestler Wilmon Menard peels a slimy octopus from his chest. He caught the "ie" in 12 feet of water.

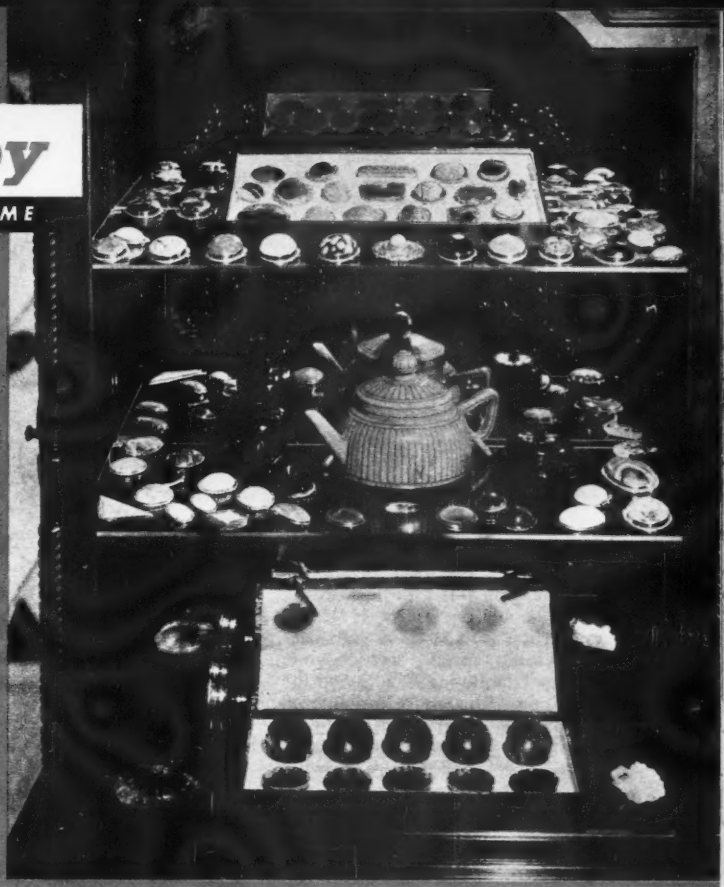
Or, a loud shout from Roo would warn me that his sharp eyes had detected a black and grey coral snake. The bite of this vicious reptile sometimes results in death. Or again, a low hiss from Roo would tell me that a

[*Continued on page* 161]

hobby

HALL OF FAME





Heart and brooch above, show Mr. Kraft's skill in carving hard jade. Cabinet, right, holds other pins and display pieces he made and mounted. Chinese artisans cut teapot, cups from solid jade in 1700s.

James L. Kraft—Artist in Jade

JAMES LEWIS KRAFT, the founder and head of the biggest cheese company in the world, Kraft Foods, started life with little money and less vision. When he was 14, a kindly doctor had his sight corrected with glasses. A sparkling world opened up the first time he plowed a field after he tried on his "new eyes." He was fascinated to see glinting chips of agate and quartz. That fascination with stones grew with the years. He learned the artist's delight in unlocking the beauty in rough stones by cutting, polishing and designing them into rings, bracelets, pins, pendants and display pieces in his Chicago basement workshop. Above all gems, that tough, mysterious rock, jade, offered the stone artist the greatest challenge—and the greatest thrill. In his lifelong quest for fine jade, he proved the stone was native to America. He discovered a 2495-pound jade rock in Wyoming and is still prospecting his own mountain of jade in California. His favorite find, however, is always the latest jade jewel he has created in his workshop. •

Birth of a gem begins as Mr. Kraft polishes a crude jade rock to reveal its secret beauty. Later he'll cut and set the jade in jewelry.

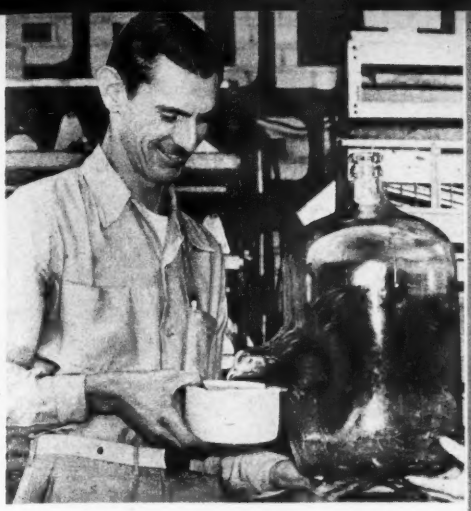
NEW in SCIENCE

Sunburn Protector dispenses sun-tan lotion for 30 seconds when you put a dime into the vending machine. Betty Dutter demonstrates how to hold the spray nozzle while you self-service your own skin. The device is designed for use at pools, beaches and tennis courts. National Service Associates, Philadelphia, Pa., is the distributor.

Midget And Giant: the world's smallest plane, the WeeBee (in foreground), is dwarfed by the world's largest land plane, the XC-99 (in background.) The giant transport is 182½ feet long, has a 230-foot wing span, weighs 265,000 pounds and carries 400 troops. The peewee WeeBee is 13 feet long, has a 15-foot wing span, weighs 150 pounds and carries one man lying prone on its back.

Leak Detector finds flaws in footballs as they come off the assembly line. The gadget sucks in air and is extremely sensitive to gases containing fluorine, bromine, iodine or chlorine. When the balls are inflated with one of these gases, a "peeping" sound in the head phones warns the tester if there's a leak. General Electric Corporation.

Little Lillibet: a 1½-ton miniature of the Queen Elizabeth, which took 6900 man-hours to build, has been completed by Bassett Lowke, famous English modelmakers. The seaworthy little liner is 21 feet 7 inches long and 2 feet 7 inches wide. Built to a one-quarter-inch-to-a-foot scale, the model has 1700 portholes and 2000 stanchions. It'll be displayed in the New York offices of Cunard Line.

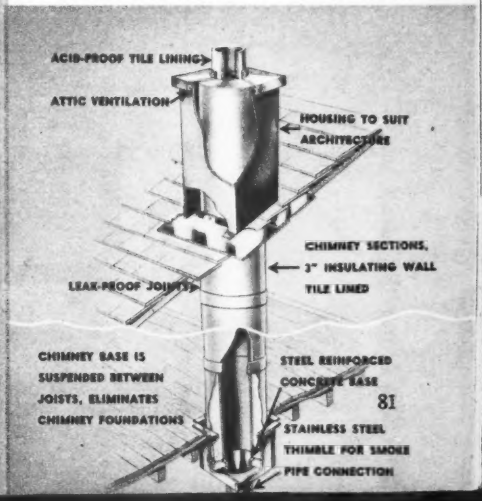


Bottled Hen has made her home in a five-gallon jug since she was a week old. Owner B. E. Efird of Landis, N. C., is experimenting with a feed compound that makes hens lay red or green-yoked eggs. The air vents in the side of the jar enable the eight-week-old New Hampshire Red to put her head through to feed. Living in glass houses must agree with hens as she seems to be less neurotic than most fowl.

Elephant Shrew is of enormous value to mankind. It looks like an oversized mouse, but it isn't a rodent at all. This long-tailed, rubbery-nosed mammal has one great virtue: its susceptibility to malaria. It is one of the few mammals, aside from man and monkeys, capable of supporting the germ. Doctors use to investigate means of overcoming the disease.

Poodle Tattoo is part of a program of the National Dog Record Bureau to mark city, state and personal code numbers inside right thigh of canines. The system, similar to one used by the Army K-9 Corps, will be employed as a nation-wide method of identification. Below, a conventional tattooing needle is used as "Ginger Snap" looks on. Inset reveals the way marks show up on the skin for easy recognition.

Prefab Chimney weighs less than a tenth as much as a brick one and costs from 20 to 50 per cent less. Ideally suited for use in prefabricated houses and community projects, it's shipped to you complete and ready for easy installation. This tile-lined, masonry chimney is insulated and built to last just as long as the house it serves. Van-Packer Corp., Chicago.



How Good Are Your Hunches?

If you've ever suspected you had psychic powers, here's a chance to try the famous Duke University tests on yourself and your friends.

By Dr. J. B. RHINE

Director, Duke University Parapsychology Laboratory

A YOUNG graduate student at Duke University dropped in to see me at the Parapsychology Laboratory one afternoon.

"Like to try your ESP?" I invited.

He nodded and I shuffled a deck of special test cards, then cupped my hand to screen them from his sight. We made a few "trial runs" to test his mood. At first he missed every card and I teased him about doing so poorly. Bridling a bit, he named three of the next five cards correctly. Then, just for fun, I began betting that he would not get the cards right. Without looking at the cards, which were all face down on a table, I said,

"I'll bet one hundred dollars you can't call the top card!"

The student looked off into space a few seconds.

"Circle," he said.

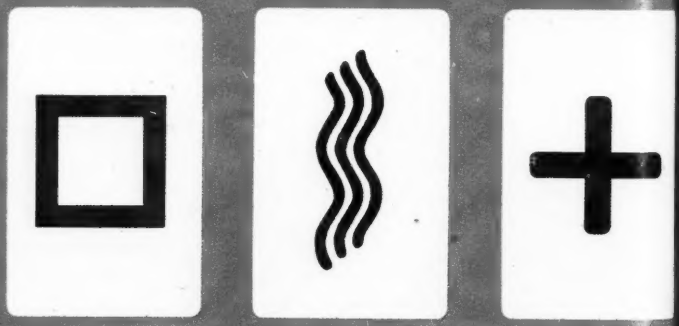
"Right," I told him, holding up the card for him to see.

I then returned it to the deck, which I shuffled again.

"A hundred on the next one."

"Square."

Testing your ESP is simple. These are the five basic cards—you can get a deck of 25 from Dr. Rhine or make up a set yourself. In telepathy tests, sender concentrates while receiver tries to read his mind. In clairvoyance tests, sender doesn't look at cards. And in precognition tests, you guess order before they're dealt.



"Right." Again the shuffle. "The next one?"

"Star."

"Right."

Again and yet again we continued until we had made 25 trials. The student made 25 straight hits! This was the first perfect score of 25 ever recorded in the ESP researches—studies of telepathy, clairvoyance and other psychic powers. ESP, as you undoubtedly know, stands for Extra-Sensory Perception.

There were 25 cards in the deck, five of each symbol, and the mathematical chances against getting 25 hits in a row by sheer luck are about 298 quadrillion to one! Working 24 hours a day, it would take *over a billion years* to call that many cards.

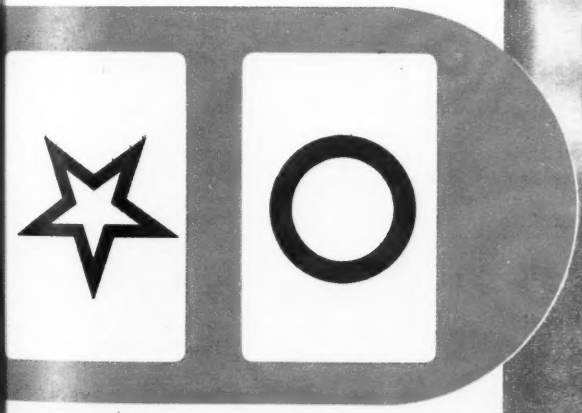
The same student performed amazingly well in later trials. "Luck" was not the answer. He was an exceptionally clairvoyant individual.

Possibly every one is clairvoyant in some degree. It is one of the "extra-sensory" powers that may affect each of us far more deeply than we know. Careful experiments have been in progress at the Duke Laboratory for more than 18 years and have been carried out in many other institutions in the U. S. A. and in Europe. They have convinced reliable investigators that the human mind can reach out beyond the barriers of space, time and substance. In transcending basic physical barriers they have even given a clue to that nonphysical part of man that we commonly call the soul.

The test just described was a clairvoyance test. Clairvoyance is the extra-sensory perception of an object. Telepathy is another of these extraordinary powers. It is the ability to perceive another person's thought without the use of the senses. Other capacities have been investigated; for example, precognition (knowledge of an event before it occurs) and psychokinesis (mental

"Come, seven!" But it's all in the interest of science as Dr. Pratt, right, checks a subject's ability to influence the dice with his mind.

Mental broadcast in progress: here "receiver" (in chair) attempts to visualize the telepathic signals being sent by "sender" (man with card).



Psychic matching test is being given by Dr. Rhine, left, in his Duke University lab as Dr. Betty Humphrey looks on. The subject indicates card she thinks is in Dr. Rhine's hand.

influence exerted on a material object). Telepathy, clairvoyance and precognition are grouped together under the general heading of "extra-sensory perception," or ESP. ESP with psychokinesis, or PK, we now call *psi-phenomena.*

Under other names this knowledge of ESP and PK is as old as the human race. There have always been hunches, prophecies, dreams, inspirations and coincidences hinting of powers far beyond the known senses. But conservative minds have always questioned the evidence. The possibility of error and falsehood, deliberate or unintentional, has been too great.

Today, however, modern research brings these mysterious capacities into the laboratory and studies them objectively. In doing so, investigators have devised many kinds of tests, some of them basically simple, and easy enough to be tried out at home.

As I mentioned before, the special ESP deck consists of 25 cards. There are five 5-card suits of simple, bold markings—stars, circles, squares, wavy lines and plus signs.

For home use, a similar deck can be made up or obtained from one of the research laboratories where ESP tests are going on. A Self-Testing Club has been started by the Parapsychology Laboratory at Durham, N. C., and will help anyone who is interested in trying ESP experiments.

Telepathy tests involve a "sender," who concentrates on a card, and one or more "receivers," who try to read the correct card from the sender's mental "broadcast." For home tests, the procedure can be as simple as a parlor game.

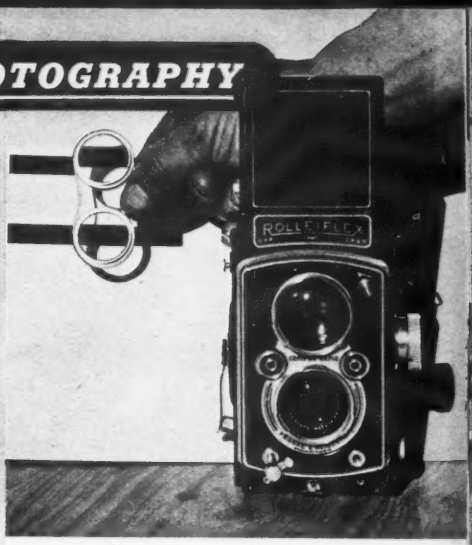
In the version thus far followed you may use the 13 cards of one suit of a deck of ordinary playing cards. Each receiver gets a slip of paper that has 13 spaces on it. The sender holds a card so the others cannot see him. He concentrates on it for ten seconds, then calls "Time!" and "broadcasts" the next card. Receivers note their guesses in the spaces provided on their slips. After all 13 cards have been "broadcast," the sender reads off the correct sequence. Each receiver then checks the number of hits on his slip.

Since there are 13 cards, the odds against each guess being right are 13 to one. By chance alone, each receiver would average one hit in each run.

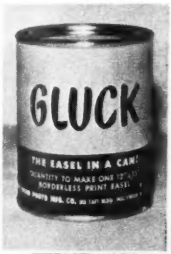
In the long run, this law of chance holds true. It can be easily tested. Lay out one suit of a bridge deck in any order you wish. Leaving this as the "master" sequence, thoroughly shuffle the rest of the deck. Now turn up the cards one at a time and place them in equal rows [*Continued on page* 162]

NEW in PHOTOGRAPHY

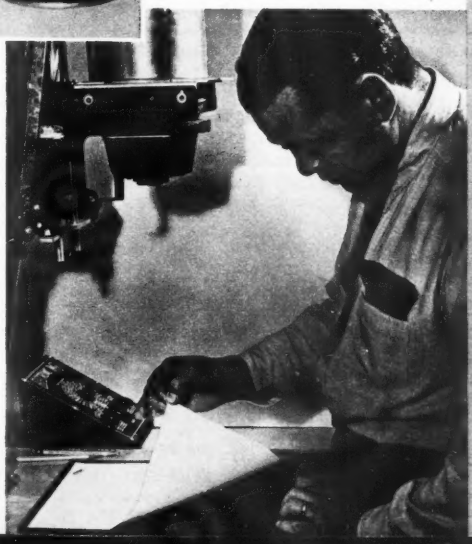
Dry Mounting Press will take up to 12x14 in. prints and mount them on stock up to 20x24 in. It has a signal light which flashes a warning when the press has reached the proper printing temperature. Can be used with plywood too. Made by Sterling-Howard Co. of New York City.



Parallax Eliminator for twin-lens reflex cameras is a double supplementary lens with the upper one containing a prism. In the photo, above, note how the top line has been optically displaced. Instant Parallix Co.



Gluck! This may sound like a beer barrel disappearing beneath the waves but it really is an enlarging easel. Just heat, pour into a tray and presto, you have it. Stays tacky indefinitely. Hollywood Mfg.



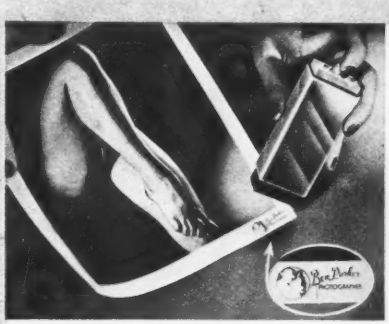
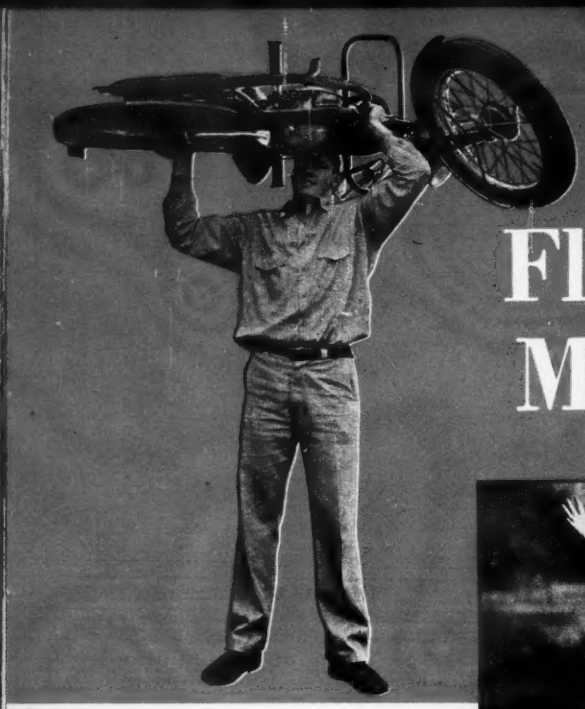


Photo-Sig permits the photographer to print his name in the corner of his pictures. Parker Mfg. Co., Los Angeles, California.

Foton, Bell and Howell's entry into the 35mm field. Has a T-2.2 lens. Shoots a burst of 15 photos in 4 seconds. Price? $700.



First Flyweight Motorcycle

Here's MI's exclusive test of the Harley-Davidson 125—America's entry in the skeleton-cycle field

By Robert Brightman

MI's Bob Brightman hits the road on H-D's 170-pound bike.

"WHY, a fellow could pick up that motorcycle and walk off with it!" was my first reaction when I saw the new Harley-Davidson 125, the latest and lightest of the 1949 line of H-D two-wheelers.

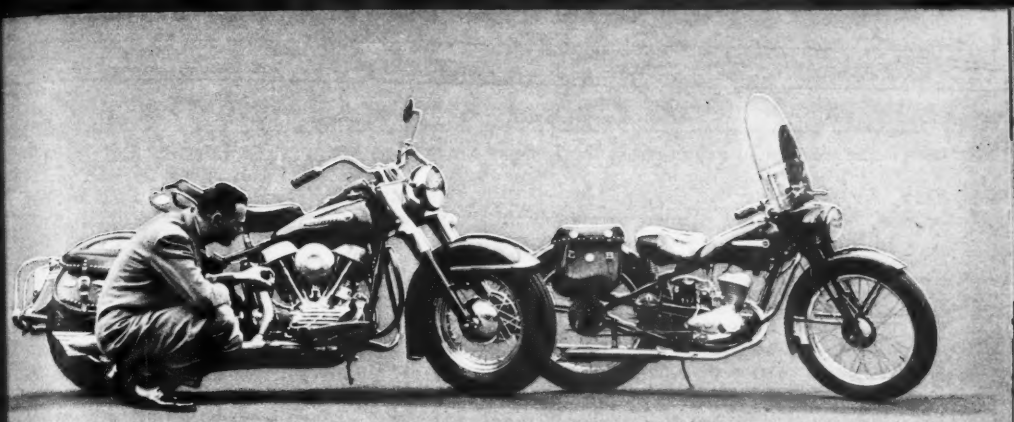
And I wasn't exaggerating too much, at that. For a few days later we asked a young guy named Edwin A. Kiel, if he thought he could hoist the little Harley's 170 pounds over his head and he did just that, as the picture on this page can testify.

Accustomed as I was to motorcycles weighing anywhere from 500 to 600 pounds, the flyweight Harley's low avoirdupois caught my fancy at the start. The whole kaboodle, complete with tires full of air and a tank full of gas, is about half the weight of the engine in my Chevrolet.

I knew that extremely lightweight motorcycles had been manufactured in Europe for many years and had won tremendous popularity over there. But I was skeptical that a similarly-built bike would be accepted in America where we seem to have a penchant for automotive transportation that is bigger and faster and more powerful than that found anywhere else.

The first time I rode the 125 I was tempted to compare its performance with the bigger machines I had ridden years ago. But I realized that such a basis of comparison was as unfair and as meaningless as rating, say, a Plymouth against a Cadillac. The lightweight Harley-Davidson is built for the fellow who never rode a motorcycle before. The big, heavy twin-cylinder jobs are bought almost exclusively by experienced riders.

Having thus tried to put myself in the shoes of a beginner who never rode a motorcycle before, I can report that this



Flyweight 125 (right) is dwarfed by its big brother, the Harley-Davidson 74 cu. in. model. However, the junior cycle is just about one-third as heavy.

You press down on small pedal for first gear. In order to get into second, disengage clutch and push the pedal upward with toe of your left foot, right.

Left handlebar holds clutch control-lever and dimmer switch, below. High windshield cuts top speed.

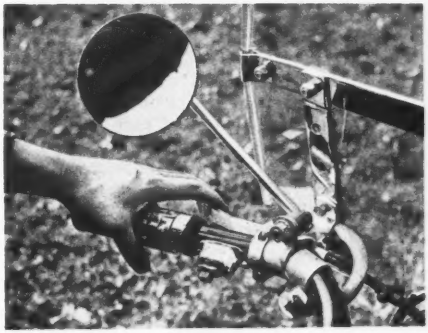
MI photos by Harold Kelly

little two-wheeler is as pretty as your first girl and as much fun to run around with. Without trying to carry this "first date" analogy too far, I found myself wishing that there had been a bike like this on the market when I was first exposed to the thrill of motorcycling. I'd have spared myself a lot of bruises and scraped shins.

Learning to handle the 125 is a cinch. It not only is light in weight but its design is so compact that a beginner can get the "hang of it" almost at once. It has enough power to get you where you want to go, up hills or on the level, quickly and safely—and yet not so much zoom that it makes a novice afraid of losing control of it. Even on cobblestones and across car tracks I could handle it without any trouble.

In second, I found the 125 had plenty of snap. As a matter of fact, on level grades and hard pavement it is not necessary to start off in first—second will do nicely. This speed will give you plenty of ginger to beat any car at a traffic light. (*Motorcyclists as well as dogs should not race automobiles.*—Ed.) In third, the normal cruising range, I found the Harley to be just a little on the short side in power. True, it built up very nicely. But if you're in a hole and want to get out—well, just don't be in it. Second is really the range for acceleration and for extreme maneuverability.

One thing I definitely like about this new



Unique, heavy-elastic, suspension system on front wheel, below, should last at least a couple of years.

job is the way the clutch is engaged. Instead of having to balance the motorcycle on one foot, leaving the other free to engage the clutch, both feet are planted firmly on the ground and the clutch is engaged by releasing pressure on the left handlebar control.

The feature I don't like, however, is the gear shifting. It's a little tricky. You press down with your toe to get into first (with the clutch out, of course), then to get into second, you close down the throttle, disengage the clutch and use the toe of the left foot to press the gear lever *upward* into second. Third, is similarly obtained. Seems to me a much better arrangement would be to have a heel-and-toe rocker assembly to eliminate the awkwardness involved in using upward pressure of the toe. But toe-shifting seems to be standard with all the lightweights so maybe the designers could be right in claiming that this really is a simpler and easier system.

This new lightweight job will not win any hill-climbing contests but let me assure you that *it will negotiate any hill on which traction is possible.* At one point I ran up an embankment just for the hell of it to see what the motorcycle would do before the motor stalled. From a dead start at a point about 15 feet from the bottom of the hill it chugged up this grade (a 30 per center) with nary a falter—in first, of course.

How about curves? As every motorcyclist knows, you steer a motorcycle with the seat of your pants—not the handlebars. This one holds on to the seat very nicely.

Brakes are more than adequate. I found myself using the front wheel brake practically all of the time except for the rare occasion of an emergency halt. In practice, I used the front wheel brake to slow it down and the rear foot brake to bring it to a complete halt.

Of course it goes without saying that parking is a cinch for the motorcyclist. However, storage is further simplified for the owner of the Model 125 because he can just pick it up with the aid of a friend and bring it right into his living room or, at any rate, the hallway of his home.

Automobile manufacturers have a rather peculiar penchant for making exorbitant claims about gasoline consumption. Somehow, your brand-new Whiffletree Eight never delivers anywhere near the high miles-per-gallon economy the smiling model in the ads is always bragging that he gets. So I'll admit I was a little skeptical when I read Harley-Davidson's claim that the 125 averages 90 miles to the gallon. That's a heap of miles, even for a 170-pound motorcycle.

I decided to make my own mileage test. After several hundred miles of riding the 125 under all sorts of conditions, a good bit of the time in heavy city traffic, I discovered that I had averaged slightly better than 90 miles per gallon.

To my way of thinking, this honest economy of operation is a darned important feature of the Harley-Davidson 125. Let's figure that you have paid $360 for the bike and plan to write it off at the rate of $90 per year. If you ride 7000 mile a year, gas and oil will cost you about $25. (This at the rate of 30 cents per gallon, which includes a jiggerful of oil with each gallon of gasoline.) Tires, greasing, transmission oil, repairs and a license tag will set you back another $30, making a total of $145 for your 7000 miles. Thus you have ridden 48 miles for a dollar, or about one mile, for two cents, as compared with a nickel a mile for a big motorcycle. These days, two cents a mile transportation is pretty inexpensive traveling.

There's no use kidding yourself that the Harley-Davidson 125 is a big, powerful, super-fast motorcycle; it's none of these and it doesn't pretend to be. For American buyers it's something brand-new and unique—a motorcycle for the beginner.

As such, I recommend it whole-heartedly, because it does the job it was designed to do. I only wish I could set back the calendar to the day when I was on the verge of buying "my first one." The 125 would be it. •

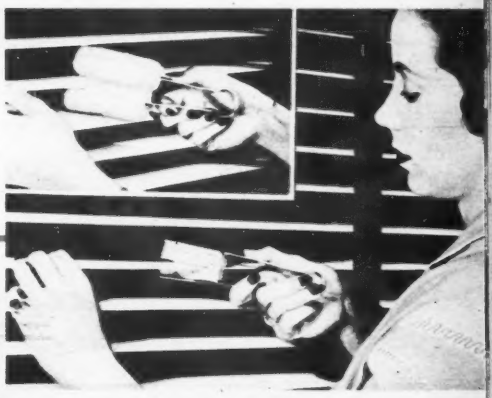
SPECIFICATIONS—
HARLEY-DAVIDSON, MODEL 125

Type of Engine	2 cycle
Number of Cylinders	1
Piston Displacement	7.6 cu. in.
Compression Ratio	6.6 to 1
Horsepower	1.7
Developed Horsepower	3
Ignition	Coil and 6-volt battery
Tire Size	19x3.25 in.
Pressure—Front	14 lbs.
Pressure—Rear	20 lbs.
Gasoline Capacity	1¾ gal.
Low Gear Ratio	29.3 to 1
Second Gear Ratio	15.4 to 1
High Gear Ratio	8.45 to 1
Gas Consumption	80 to 90 mpg
Price	$360.00

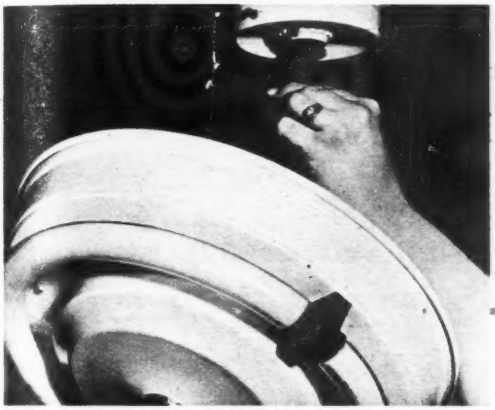
NEW for the HOME

Slat-O-Mat Jr. speeds up your job of dusting and washing Venetian blinds. For washing, two sponges anchored to a metal plate snap into the gadget. For dusting, lamb's wool pads are used. U. S. Venetian Blind Co., Detroit.

Magnetic Walls attract hangers in the new showrooms of a New York manufacturer. A magnetic core a few inches wide and several feet long is embedded in wall. Buyers are astounded when the clothes seem to hang in space.

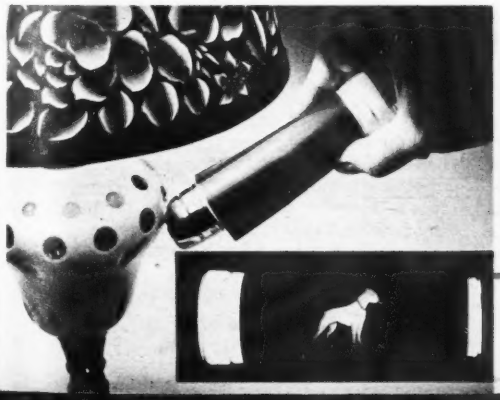


Circle Light is a new fluorescent lighting unit which can be mounted on a standard overhead fixture. No special tools or parts are needed to attach the 100-watt, Circlarc, made by National Lighting Products, Chicago.



Cleaning Mitten is made of lintless, cellulose sponge which holds an enormous amount of water. It can be boiled for sterilization and soaked in disinfectant without any harmful effects. Gold Seal Specialties, Brooklyn, N. Y.

Flashlight Pictures glow in the dark (inset) when you wrap an ordinary negative around the barrel and expose it to a strong light. This activates the luminous material on the case. Winchester Arms Co., New Haven, Conn.



"Climbs mountains like a goat," says MI's Tom McCahill about this new 1949 model of the Studebaker Land Cruiser.

MI Tests the '49 Studebaker

By Tom McCahill

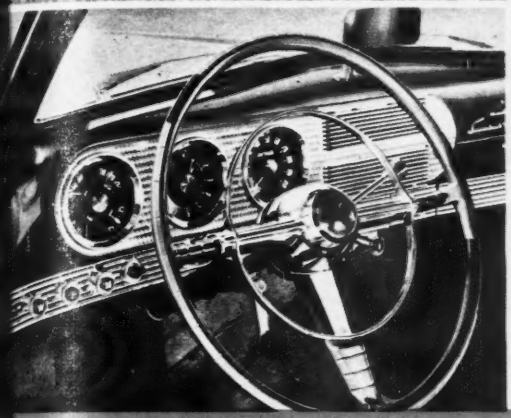
STUDEBAKER is still the Miss America of the new automobiles—even after holding the title for three years!

Since 1946, competitors have fallen over themselves in a mad rush to produce bulging, ungirdled exaggerations which, they hope, will out-Studie the Studebaker. But it is still the trim leader of its own original style setting.

In a business such as the automobile business, Studebaker has done very well—as an independent outfit they have accomplished a modern miracle. The average automobile designer and industrial planner would steal his mother's last slug of whiskey on a zero night if he thought he could raise a dime on it. And it was against this gang that a nice bunch of guys from South Bend came to the front three years ago. They still refuse to move out of the picture.

Well, to steal a bit of technique from Walter Winchell and Drew Pearson, past masters of the art of reminding the public how good they are when an occasional prediction comes true, we now blushingly say—*remember what we wrote on these pages in 1946!* We predicted that the radically new Studebaker would be copied by everybody before 1950. Now, just look around.

The 1949 Studebakers are basically the same as the '46 models with the exception of the Commander and Land Cruiser. They do have an engine change—increased horsepower. The old six-cylinder engine developed 92 hp at 3600 rpms. The new engine develops 100 hp at 3400 rpms due to an increase of an eighth of an inch in the stroke. This increase has removed all trace of torque agony in high gear.



After miles of rocky test-terrain, Tom's pooch points to the only damage—one missing hub cap (top of page). Clean-cut dashboard (above) is an uncluttered affair with every dial completely visible to the driver. Increased luggage space is available in the new models (top of page), since spare tire is now mounted vertically in the trunk. Alligator trim and nylon upholstery (above) give Land Cruiser a luxury interior.

As for the interior, the dashboard has all the instruments located in plain view of the driver—none hidden behind the steering wheel. The all-nylon upholstery is really designed for lasting beauty and the details of finish in the interior are perfect.

For my test, I decided to go to El Paso, Tex., which affords just about every type of travel condition from rugged, mountain trails to long, level stretches where you can give a car its head and let it beat its little brains out. The Southwest had some snow of its own this year and 600 miles from El Paso I found myself completely surrounded by the stuff. For two days I was bottled up in a motor court, listening to the radio announce all roads impassable.

On the third day, I was advised that travel might be attempted only in the name of extreme emergency and as that's the editor's nickname, I started out for El Paso in my own automobile. For the first 100 miles, I was the only guy in sight as I plowed across the ice and snow-covered prairie highway, averaging close to ten mph. All of a sudden, I heard a horn and a Studebaker Commander rushed by. Feeling a little sheepish about my own speed, I hit the throttle and started to follow suit. There was another horn blast and, so help me, another Studebaker whizzed by. And then again a third—all Commanders.

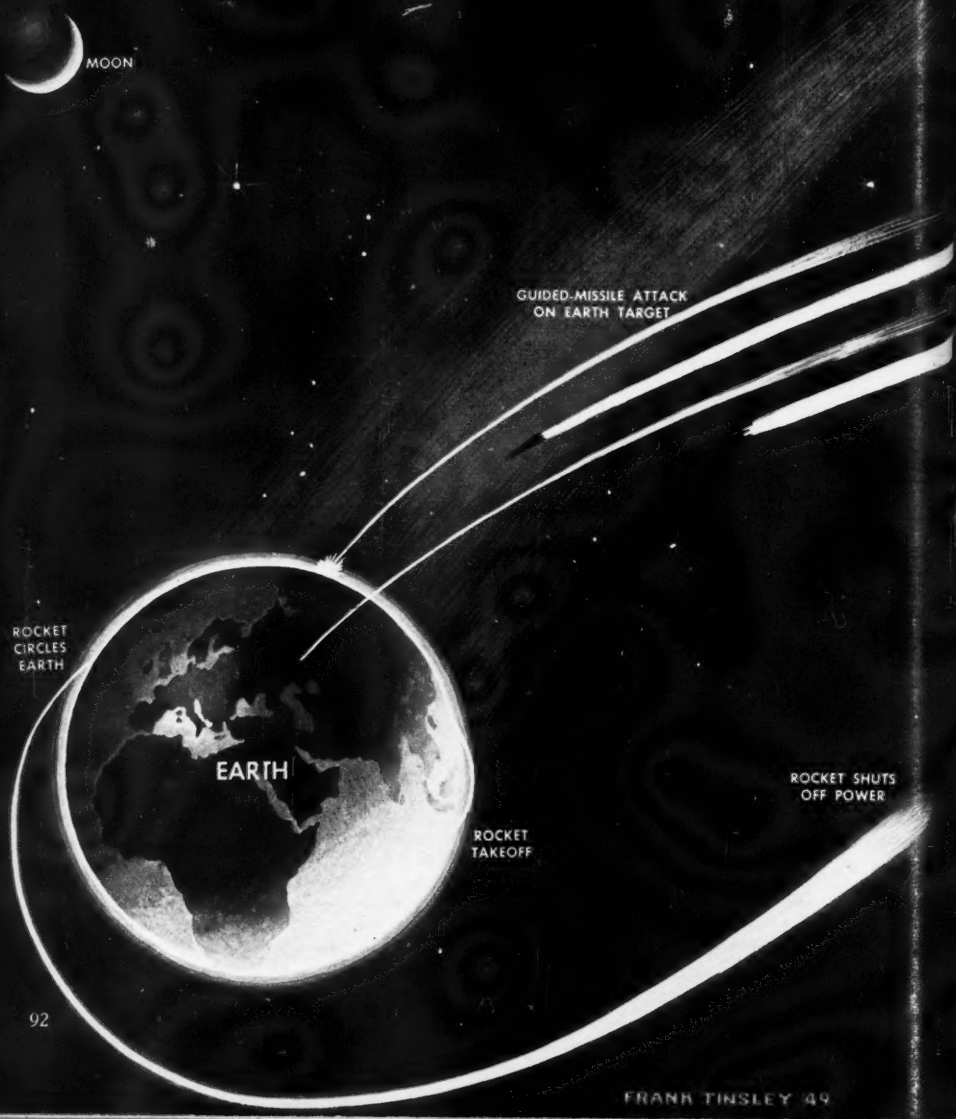
Well, a guy can stand just so much of that, so I closed in behind them and did my best to stay there. As the day progressed, more and more cars appeared—but the three Studebakers passed everything. Their traction was amazing.

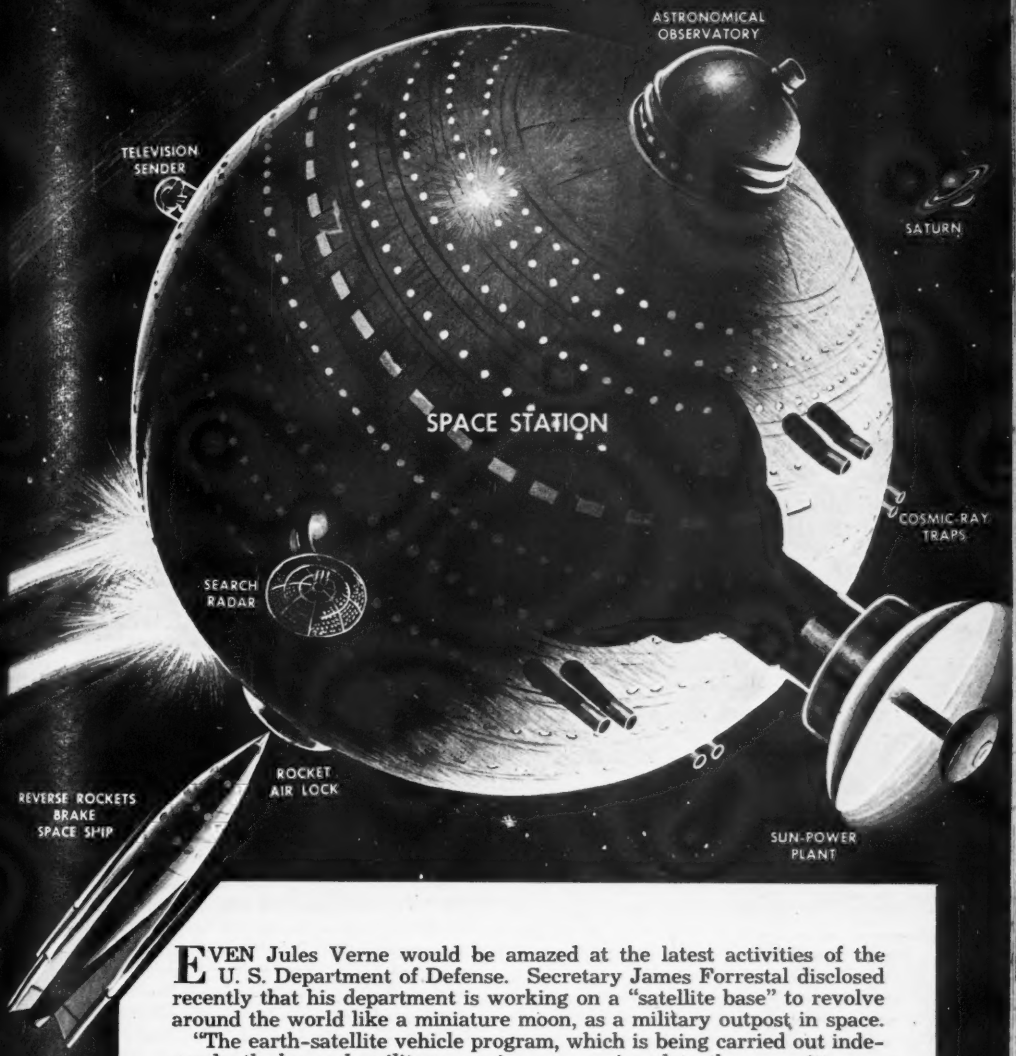
Perhaps due to the cold, my alleged brain was working slower than usual because it was some time before I started thinking—isn't it a bit [*Continued on page* 163]

Fortress on a Skyhook

The U. S. is working on plans for a satellite base, Defense Secretary Forrestal reveals. Take a long look at this man-made moon—and learn how it may rule the world.

By Frank Tinsley





EVEN Jules Verne would be amazed at the latest activities of the U. S. Department of Defense. Secretary James Forrestal disclosed recently that his department is working on a "satellite base" to revolve around the world like a miniature moon, as a military outpost in space.

"The earth-satellite vehicle program, which is being carried out independently by each military service, was assigned to the committee on guided missiles for co-ordination," he revealed in his first annual report on the national military establishment. "To provide an integrated program with resultant elimination of duplication, the committee recommended that current efforts in this field be limited to studies and component designs. Well defined areas of research have been allocated to each of the three military departments."

There is considerable speculation as to just how far this program is meant to go. An earth satellite may be almost anything. It can range from a tiny bit of matter, projected into space for astronomical observation, to a permanent fortress on a skyhook.

We have already tried to hurl metal slugs into space. Last year at White Sands Proving Grounds, New Mexico, a V-2 rocket began firing

these little man-made meteorites at 10-second intervals after reaching an altitude of 120,000 feet. The rocket zoomed up 111 miles above the earth and technical experts hoped that some of the slugs would escape the earth's gravity so that they could be studied as tiny satellites. From all reports, this space experiment was a failure.

No one but the scientists and the top brass know the exact nature of the next effort. It may be a preliminary, unmanned rocket, equipped with automatic instruments and a radio telemetering device for sending their data back to earth.

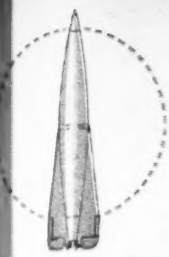
On the other hand, rocket development may have advanced far enough for us actually to build a small space ship. Such a rocket could carry several scientists on a limited observation flight around the globe, then return to base before exhausting its air supply.

Finally, with experience gained from this trial flight into space, we could plan a bigger ship that would transport the first prefabricated units for assembling a base in the sky.

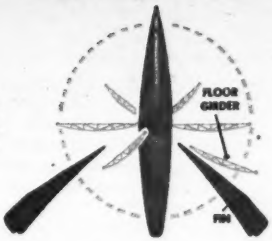
During World War II, the Nazis toyed with the idea of setting up a mirror platform in space to beam the concentrated rays of the sun in a deadly "sun-gun." The first official hint that the U. S. was considering plans for its own secret weapon in space came to light in April, 1946. General Curtis E. LeMay had a cryptic item buried in an announcement then of his research program. A brief passage in this report called for development of "flight and survival equipment for use above the atmosphere, including space vehicles, space bases and devices for use therein."

With the rapid progress of scientific research in the past few years, we have seen the birth of atomic power and the phenomenal growth of aviation engines from wind-milling motors to mighty rockets streaking a plane like the Bell X-1 at a supersonic speed of 1700 mph. Unmanned rockets, like the Navy's new Neptune, are nearly ready to outstrip the Nazis' sensational V-2 and nudge the 250-mile mark.

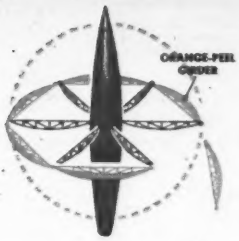
Helicopters hover around this rocket ship to load provisions before it zooms off to the satellite base. Note foldaway landing gear and access ladders built into the leg wells of this tender, designed for shuttle service. To avoid contaminating the earth, rockets on the fins are used for takeoffs and landings. The atom jet is switched on only for travel in space.



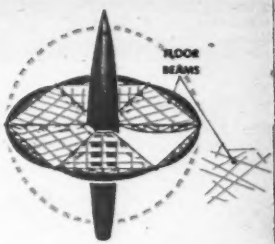
1. First rocket arrives at the site for the base.



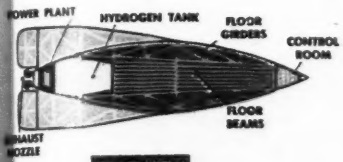
2. Fins drop off and floor girders pop out.

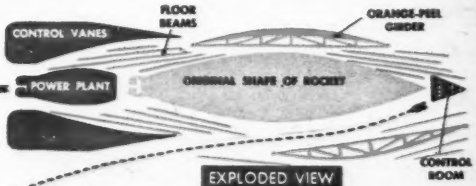


3. Orange-peel girders form rim for main floor.



4. Hollow beams form a grillwork for flooring.





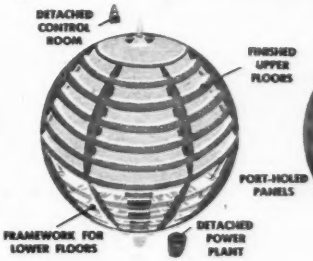
Labels on the diagrams above show key elements in a "material" ship. Atomic pile heats hydrogen in jet.

After a ship has been broken down for building the base, control and power units form a utility craft.

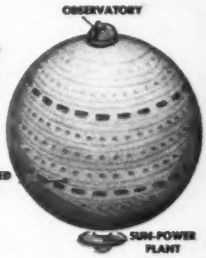
FRANK TINSLEY '49

5. A second ship brings more girders and floor.

6. Third ship completes the primary structure.



7. Rocket 4 adds floors and interior equipment.



8. Fifth ship adds skin, sun plant, observatory.

That will put today's rockets already well out of the earth's atmosphere and almost half way to space-station altitude.

The atomic power plant is about to solve many of the problems of space travel. The virtually unlimited power of the atom engine will enable the rocket to pick up speed gradually. Atomic energy's almost infinite duration contrasts with the prodigious fuel load a chemical rocket would need merely to escape the earth's gravity. Such a rocket would require a fuel tank as big as an oceanliner to flash it out of the world at the minimum theoretical speed of 5 miles a second. In short, the atomic engine's virtues make it almost ideal for a space ship.

Almost, for there are some disadvantages too—such as radiation shielding and the dissipation of the enormous excess heat generated by the reactor. That heat hits the incredible figure of 600 billion degrees!

These problems are being tackled one by one. Atom experts are developing light, composite shields, which reflect neutrons with one material and absorb the deadly gamma rays with another. With some of the best brains in the country on the job, even that terrific heat and the bugs common to all new mechanisms and processes soon will be conquered.

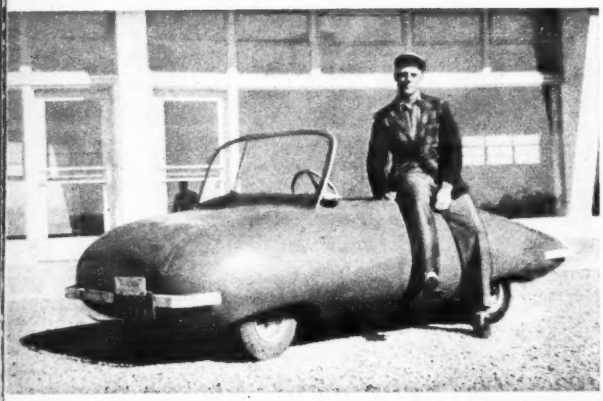
Of course, in the coming space ship the atomic reactor will merely replace chemical fuel in providing heat for gas expansion. At super-atmospheric altitudes, where air is absent, some other working gas must be expanded and ejected through the jet nozzle to produce thrust. This gas will have to be carried in tanks.

At the moment, [*Continued on page* 165]

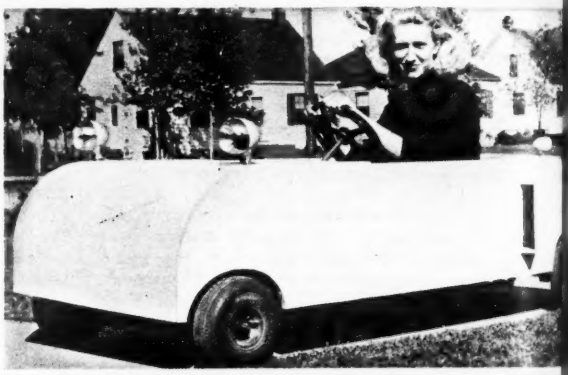
CRAFTS and HOBBIES

Workbench Award Winners...

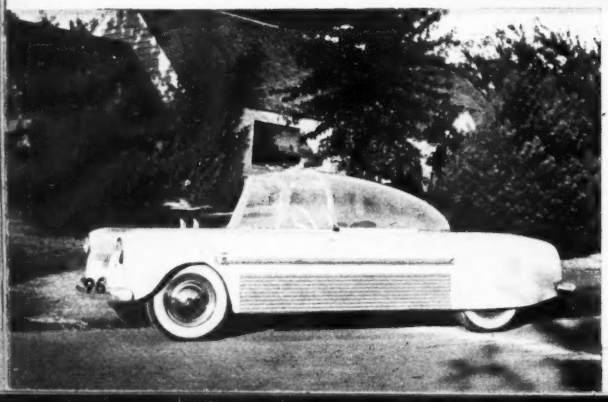
THE proud builders of each project pictured this month are five dollars richer and also have our beautiful Workbench Award Certificate. Their entries were chosen, as the best submitted for the month. We know you like to see what others are doing—and we know others like to see what you are doing. So why not send us a few photos of yourself with your project? If judged one of the best received during the month we'll publish your picture, send you a five dollar check and a Workbench Award Certificate. Enclose sufficient stamps for return postage and mail your entry to: **WORKBENCH AWARDS, MECHANIX ILLUSTRATED, 67 West 44th Street, New York 18, N. Y.**



THIS month we're going to feature "home-made" cars and number one is this beautiful streamlined runabout by S/Sgt. Bill Roush of Maxwell Field, Montgomery, Alabama. "The body," writes Sgt. Roush, "is made up from two belly or wing tip tanks. The power plant is a 6 HP Briggs and Stratton Engine which produces a top speed, with two persons, of about 35 mph. I have about $300 invested in this job and certainly feel I got my money's worth in mileage and fun."



HERE'S a prize project produced by Mr. and Mrs. Bernard A. Hines of Gary, Indiana. "It is fairly small," they write, "but large enough to carry two people comfortable at a speed from 12 to 15 mph. Wheelbase is 63 in. and power is a one cylinder air cooled engine mounted in the rear. A belt connects the motor to a countershaft and a chain from the countershaft drives one of the rear wheels.



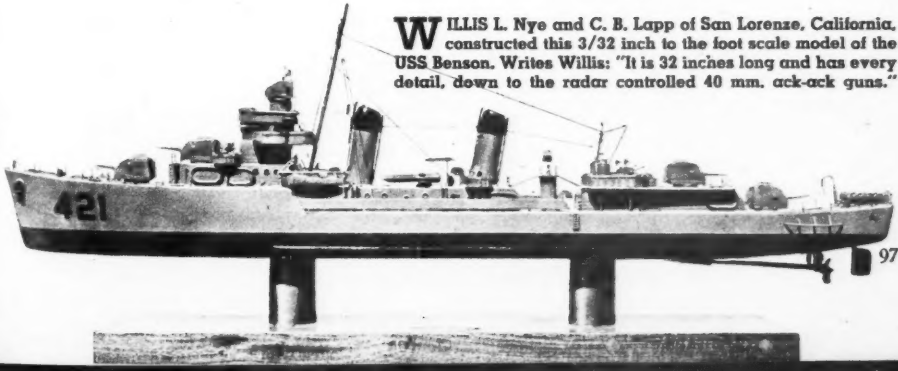
VERNON Sears and his dad, Ray Sears of Tulsa, Oklahoma, developed this snappy-looking sports car from Ford, Cadillac and A-26 Invader parts. Write the Sears: "Two 1942 Ford fenders were cut in half to form the curved portion of the four fenders. The plastic top was salvaged from the nose of an A-26 Douglas Invader while the engine is a hopped up V-8 with dual carburation and other refinements.

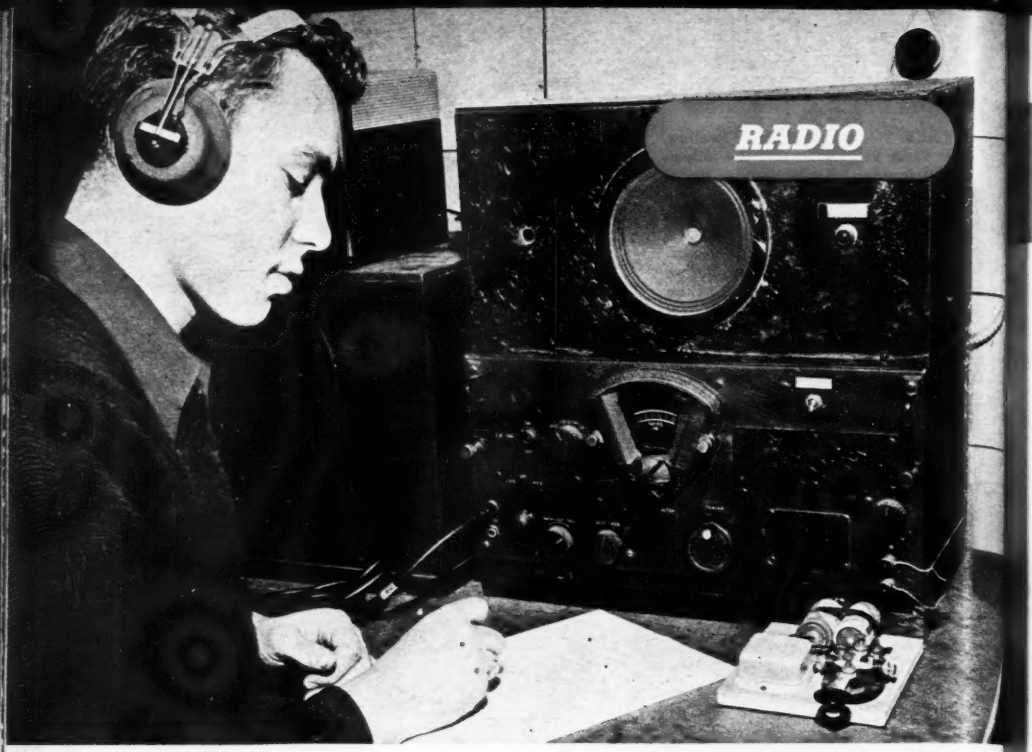
JACK J. Dempsey, of Wheeling, West Virginia, wrote the following letter when he submitted his model airplane entry: "Here are my two most prized possessions—my wife Barbara and my recently completed Great Lakes Trainer built from your plan No. 387. Although I am rather new at model building (this was my first control-line job) I found your plans exceedingly easy to follow."

R. O. McMahan of Emmett, Idaho, is the proud owner of Snuffy, which he built from MI's plan No. 955. Writes McMahan: "I have found this boat to be very maneuverable with a 7½ HP outboard and capable of speeds up to 18 mph with two men aboard. Total cost, excluding the power plant, was $59.60 and it required about three months of spare time to construct. Seated in my Snuffy is Hy Woods, who is as thrilled as I am with the performance of this boat."

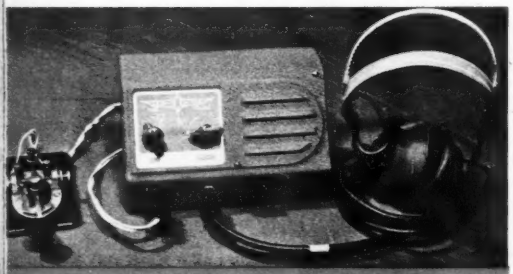
DAN Muncy of El Monte, California, launched MI's 20-ft. auxiliary sloop Poco Dinero (plan No. 995) last May and has nothing but praise for this fine design. Says Dan: "I laid the keel in 1946 when I was 21 and spent the next two years building her. She was my first boat and built mostly with hand tools. At half throttle I get an honest 5 mph, using a Universal Fisherman engine. She handles wonderfully well and when launched she stopped right at the waterline. No trimming was required at all!"

WILLIS L. Nye and C. B. Lapp of San Lorenze, California, constructed this 3/32 inch to the foot scale model of the USS Benson. Writes Willis: "It is 32 inches long and has every detail, down to the radar controlled 40 mm. ack-ack guns."

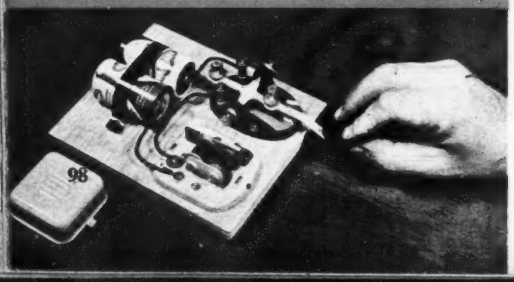




Learning the Code



Above: This commercial code-practice set pictured works on your 110-volt house line, contains a small loud speaker and adjustable tone and volume controls. Can be used with or without earphones. Cost: about 12 dollars. Below: This home-made code practice set is built around a bell buzzer and costs less than a dollar.



Number one requirement toward your "ham" ticket is to unscramble those dots and dashes. Here's how you can learn at home.

By Robert Hertzberg

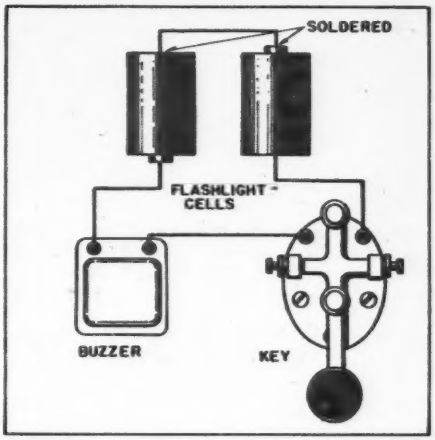
MAYBE you are a competent radio experimenter. Perhaps you can even explain how television works. But you don't really "belong" in the radio game until you learn the code and obtain a license as a full-fledged radio "ham." The whole world then becomes your playground. The dots and dashes that always sounded like so much hash now become meaningful messages to you. You can hear American hams in Frankfurt and Berlin exchanging greetings with friends in Kentucky and California; you can follow ships at sea and planes in the air. When you get around to building a short-wave transmitter of your own, you too will be able to participate in

A fine way to learn the code: two lads seated comfortably at a bridge table in the living room, one sending while the other copies. The sending operator has his full arm on the table, muscles relaxed, and first two fingers resting on the knob of the key.

long-distance communication. You're not likely to forget the thrill you'll enjoy the first time you "work" a fellow ham in England or Japan.

To qualify for an amateur radio operator and station license, you must be able to send and receive clear text at the rate of 13 words per minute (five letters per word), using the dot and dash characters of the Continental Code. Admittedly the code sounds a bit difficult at first, but it certainly can be mastered. Practice is what does it. Since there are now almost 100,000 licensed hams in the United States alone, the test can't really be tough. Just recently a girl of ten passed it successfully, so *you* have no excuse for flunking!

There are all kinds of "systems" for learning the code, but the simplest and cheapest happens to be the best. For equipment, a dollar will cover everything. You need a radio key, which you can buy as brand new Army surplus for about fifty cents or less; a common door buzzer, which costs about thirty cents if you can't find one around the house; and two flashlight cells of either the "C" or "D" size, costing twenty cents. These three [*Continued on page* 134]



The Continental Code

A . —	F . . — .	K — . —	P . — — .	U . . —
B — . . .	G — — .	L . — . .	Q — — . —	V . . . —
C — . — .	H	M — —	R . — .	W . — —
D — . .	I . .	N — .	S . . .	X — . . —
E .	J . — — —	O — — —	T —	Y — . — —
				Z — — . .

Numbers

1 . — — — —	6 — . . . .
2 . . — — —	7 — — . . .
3 . . . — —	8 — — — . .
4 . . . . —	9 — — — — .
5	0 — — — — —

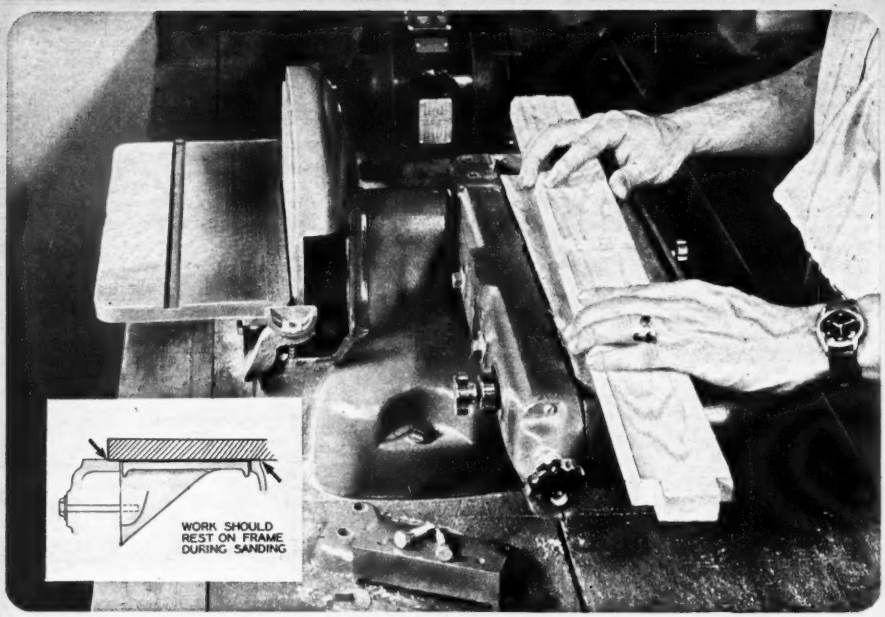
Punctuation

PERIOD	. — . — . —	END OF MESSAGE	. — . — .
COMMA	— — . . — —	WAIT	. — . . .
QUESTION	. . — — . .	GO AHEAD	— . — .
ERROR	. . . . .		
END OF COMMUNICATION	. . . — . —		

By Groups

E .	T —	A . —	N — .	U . . —	R . — .	G — — .
I . .	M — —	W . — —	D — . .	V . . . —	F . . — .	Z — — . .
S . . .	O — — —	J . — — —	B — . . .	4 . . . . —	L . — . .	P . — — .
H	0 — — — — —	1 . — — — —	6 —			
5						

Others: K — . — Y — . — — 7 — — . . .
X — . . — Q — — . — 8 — — — . .
C — . — . 3 . . . — — 9 — — — —
2 . . — — —



HOW TO USE THE COMBINATION SANDER

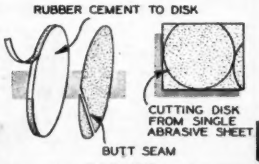
The first of a series of articles for both beginners and experts on the proper use of machine tools.

By Roland Cueva

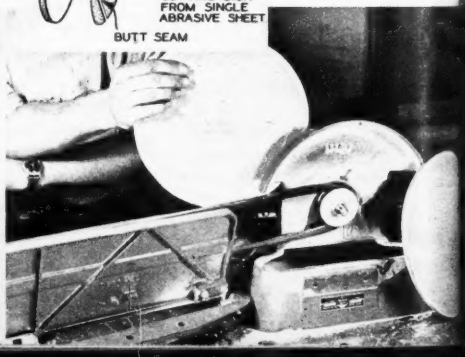
BECAUSE half the secret of producing satisfactory woodworking projects in your workshop lies in good finishing, a combination sander should be included in your basic equipment. A professional-looking finish on any piece of work—whether natural, paint, or lacquer—depends on the base under it—which means sanding and more sanding.

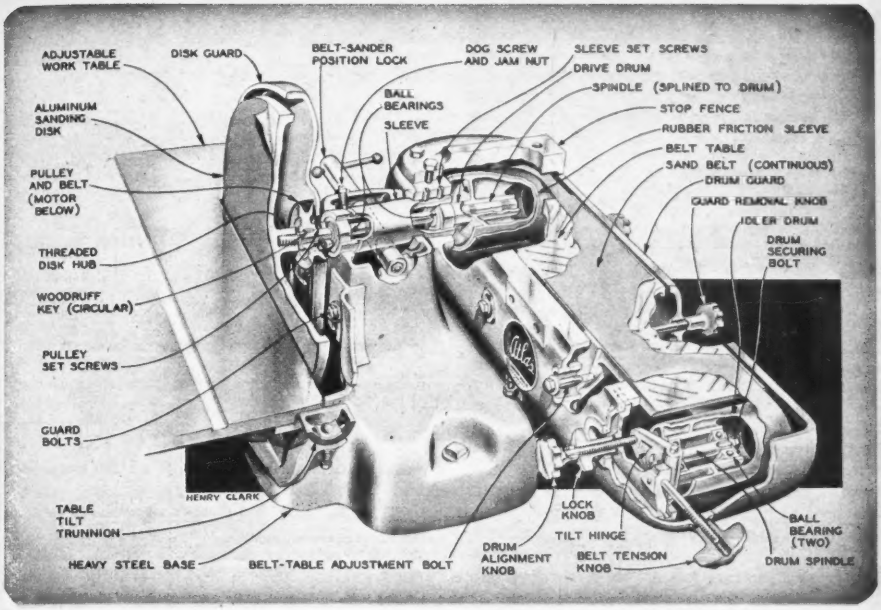
With a combination sander, you can ob-

Outside contours are easily shaped on the abrasive disk of the versatile, power-run combination sander.



To speed work, keep two disks on hand—one covered with a fine paper and the other with coarse.

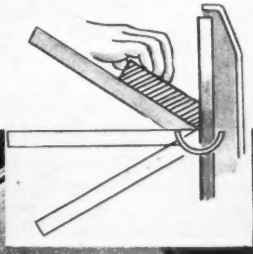


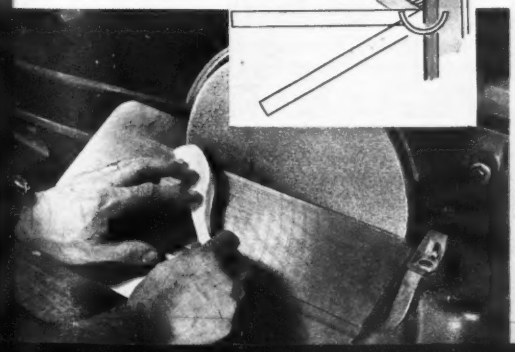


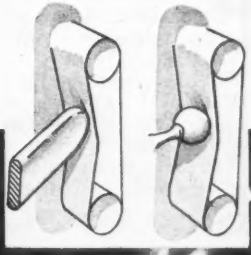
tain perfectly sanded surfaces in a fraction of the time required for tedious hand methods. In addition to conventional sanding of pieces of almost any shape and size, this versatile tool can handle other types of work, such as reduction or shaping of small and medium-sized parts. With it, you can round off edges and corners with great accuracy, accomplish contour sanding, and practically eliminate the necessity of planing. By employing various grades of abrasive on the disk or belt, it is possible to eradicate in an instant the most stubborn saw marks or other defects and progress to the fine, satiny surface that spells a clean, even, perfect finish.

To get the most out of it, the sander should be properly mounted. The best arrangement is to bolt it to an individual stand about 30 in. high, with the motor on a shelf or bracket below. If desired, the stand can be on casters for portability. These sanders, however, are built so the motor can also be placed to one side; thus the complete outfit may be set up on a workbench, as shown in the photos. The important thing is to have plenty of space all around the tool and to have it accessible

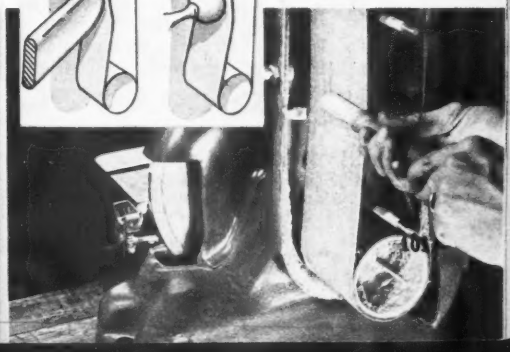
For sanding work at an angle, the table can be tilted either up or downward; then locked tight.

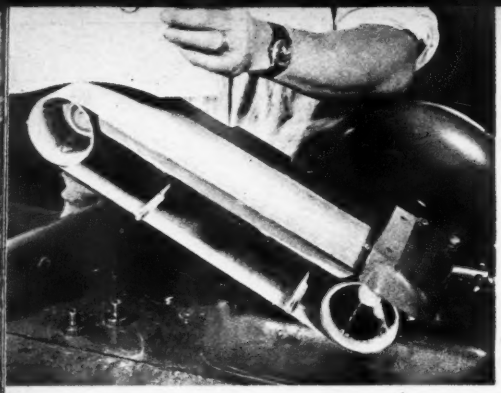




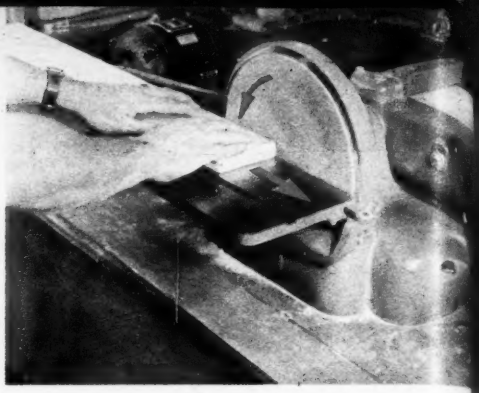


The underside of the belt has no backing; so it is flexible. Round work is easily handled, as shown.





You'll want to sand out many an inside contour. Removing the guard and tilting the carriage, as illustrated, permits this to be done efficiently.



When sanding the edge of a board, always move the work across the counterclockwise-rotating disk from left to right, never from right to left.

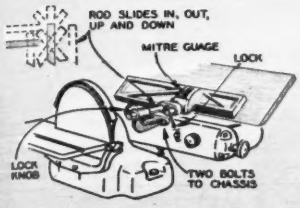
from *both* sides. There will be many times when you will want to work on the belt from the far side; so don't mount it on a bench or table against the wall.

Sawdust is controlled by cutting a hole in the bench top under the base of the sander and putting a box there to catch the dust. The belt drum guard has a sawdust ejection nozzle over which a cloth bag can be tied. It's a good idea, incidentally, to collect and save some of your sander dust—it has a fine flour consistency and when mixed with Cascamite or other plastic adhesive makes an excellent wood dough for filling cracks, countersunk nail heads, etc. By keeping dust from various woods in separate jars, you can have the ingredients of a matching filler handy for any job.

How do sanders of this type operate? Generally, disk and belt are run on a single shaft, rotating counterclockwise simultaneously at the same speed. A ⅓-hp. capacitor motor is adequate for average work, but if you expect to run pretty heavy loads, a ½-hp. motor would be better. The sanding belt is continuous, passing over two drums, one at either end. It has a removable guard on the side and a stop fence on top against which the work can be firmly held. The belt assembly is pivoted so it may be set in any position from horizontal to vertical. The belt sander is used mainly for flat work, though with-the-grain edges can be sanded square, beveled, softened, or rounded off. Round pieces can also be sanded on the belt, after a bit of practice, by holding the work against the fence and rotating it slowly in the hands. With the stop fence removed, long planks are accommodated.

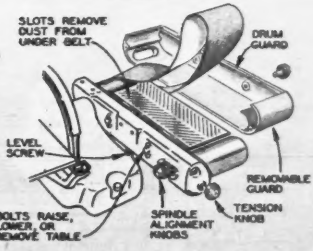
In flat sanding, move the piece being sanded slowly back and forth with the grain as the belt runs under it, keeping a light but even pressure on it. One mistake the beginner may make is to "over press" the work, which shortens the life of the abrasive and can cause burn marks on the wood. Let the machine do the work—heavy pressure is unnecessary. The sanding belts are supplied by the manufacturer in various grades from fine (3/0) to fairly coarse (1½). A good arrangement is to use the finer grades on the belt and coarser on the disk, where edge sanding across the grain is done. For wood alone, a garnet abrasive is satisfactory, but the aluminum-oxide types are preferable, not only because they wear longer but also because metal as well as wood can be sanded on them. With the belt carrier raised and guard removed, the ends can be employed as drum sanders for concave work. In vertical position, irregular and odd-shaped pieces can be sanded on the *under* side of the belt, which, because it has no backing plate, is more flexible than the top. For guiding straight work, adjustable fences, similar to the ripping fences on circular saws, are available as accessories.

Edge sanding of all kinds is done on the disk, which is equipped with an adjustable table on which to rest the work. This table is milled like a saw table to take a miter gauge, so very accurate work is possible. The table tilts and locks in position at any angle to 45°, up or down. Picture-frame and other mitered corners can be sanded to a precision that will make the joints virtually invisible. Rounding corners and edges is a simple task on the disk. Always hold the work against the half of the wheel turning *down toward* the table—work held against the up-spinning side is liable to be knocked rudely from your hands. When sanding long work on the disk, feed it slowly and steadily into the direction of rotation, never the other way. If for any reason, you *have* [*Continued on page* 144]

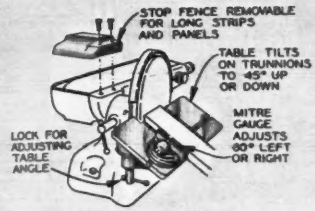


FENCE GUAGE FOR USE WITH BELT WILL ACCOMMODATE LARGE PLANKS

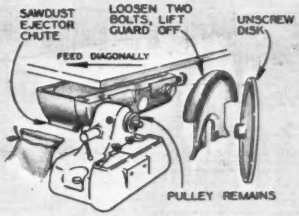
FOR BELT-SANDING LARGE PANELS



DON'T WORK WITH LOOSE CUFFS, TIES, OR OTHER FLAPPY APPAREL

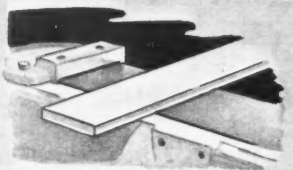


OTHER FEATURES, INCLUDING GAUGE

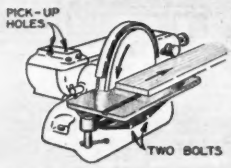


DISK AND GUARD ARE REMOVABLE

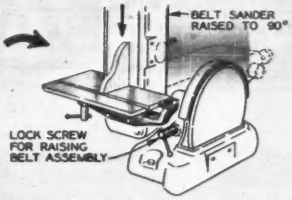
DON'T POWER-SAND THIN STRIPS... MAY BE SWEPT FROM FINGERS, JAM UNDER GUARD



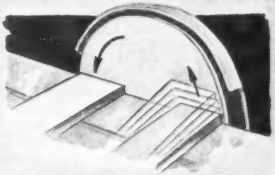
DON'T SAND CROSS GRAIN ON THE BELT... WILL SCORE WOOD... BETTER RESULTS WITH DISK



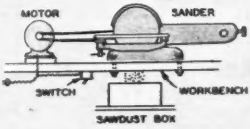
WORK TABLE IN POSITION FOR DISK SANDING, IS QUICKLY REMOVED ~

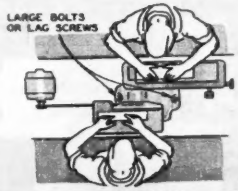


OVER TO BELT-SANDING WORK BY SWITCHING TWO BOLTS



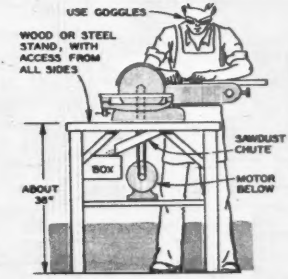
DON'T USE R. H. FACE OF DISK... THIS FLINGS WORK UPWARD, ALONG WITH MUCH SAWDUST!



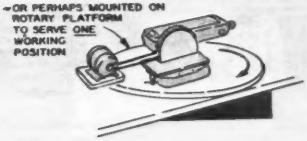


SANDER SHOULD BE ACCESSIBLE FROM BOTH SIDES OF BENCH

BENCH MOUNTING



STAND MOUNTING



DON'T FORCE WORK... DISK CUTS RAPIDLY, WILL OVERCUT OR BURN-MARK WOOD

DON'T HAMMER NEAR SANDER FRAME... YOU MAY SLIP AND CRACK SOMETHING!

car care

Photo by Robert Brightman

Traffic on the George Washington bridge. Cars on the right are leaving New Jersey.

Sluggish acceleration may be due entirely to trouble with the acceleration pump of the carburetor. Here's how to make sure: Take off the air cleaner and look into the carburetor through the air intake, using a flashlight. When you operate the accelerator rod you should be able to see raw gasoline squirting into the carburetor body.

Flashing, the auto mechanic's term for jumping of high tension current from the top of a spark plug to the cylinder head, can be prevented by keeping the plugs clean externally. Dirt on the insulator holds moisture.

Wheel balancing calls for special skill. Be suspicious of the operator who hangs on too many balance weights. He may be trying to correct his own mistakes.

Self-sealing inner tubes can be badly damaged by a nail that continues to remain in the shoe. That's why regular inspection of the tire is important where such tubes are used.

Use a rust inhibitor when refilling your radiator for summertime driving.

BEHIND THE WHEEL

With Fred Russell

If you want a personal reply, please include a stamped, self-addressed envelope.

My 1933 Oldsmobile jumps out of gear everytime I put it into second. Jack Blend, Pittsford, N. Y.
Loose motor mounts or weak springs in the shifter rails may be the cause of your trouble.

At speeds of 25 to 30 mph I get a regular tire thump in my 1947 Buick. This is most apparent on smooth asphalt pavements. Harvey Curtis, Somerville, Mass.
That thumping noise you get is characteristic of synthetic tires.

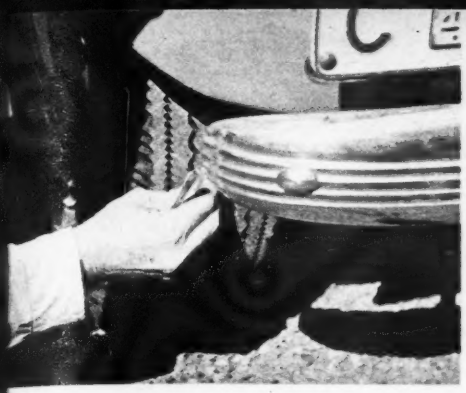
Where is the No. 1 cylinder on the 1935 V-8 Ford? Stanley Lichorobiec, Detroit, Mich.
It is the one nearest the radiator on the left side looking at the engine from the front of the car.

I have a peculiar sound in my 1939 Plymouth which seems to come from the transmission. Yet, the car shifts OK and the clutch works fine. Harold Maciel, St. Louis, Mo.
Check the throwout bearing of the clutch. Have you taken a look at the hand brake behind the transmission? This exposed brake drum often catches twigs, which give all kinds of puzzling noises.

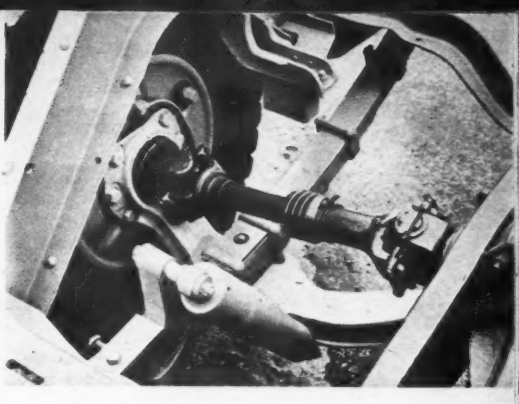
What causes the clicking noise in the speedometer cable on my 1948 Kaiser? Jack T. Teatsorth, Inglewood, Calif.
The clicking sound is caused by too sharp a bend in the cable.

My 1937 Lincoln will only run smoothly when the choke is pulled out slightly. Why? Harold Ginsburg, Brooklyn, N. Y.
The need for choking your car is due to an air leak around the intake manifold.

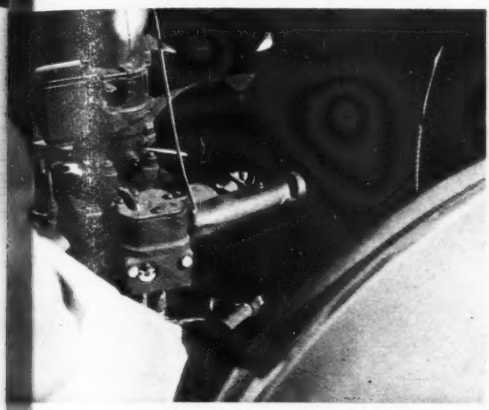
What causes my 1948 Ford to buck and jerk when slowing down in high gear? George C. Haug, Eau Claire, Wis.
This may be due to an over-rich carburetor mixture. Try leaning the idling mixture as this is the one that comes into operation to a greater degree when the throttle is closed.



Spotty tread wear on low pressure tires indicates need for important changes in front-end design. In the meantime keep tires inflated to 26 pounds.

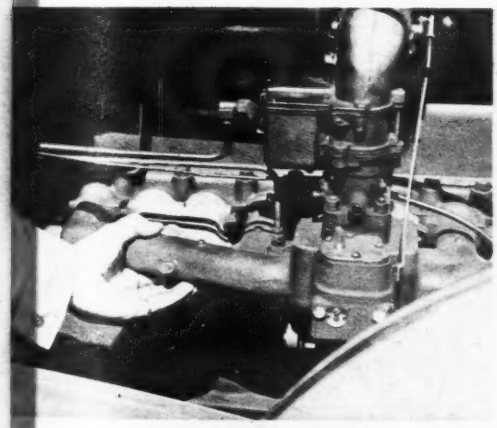


New Dodge Route Van has three rear axles. A dead axle supports the rear of the truck while two live axles transmits power to both rear wheels.

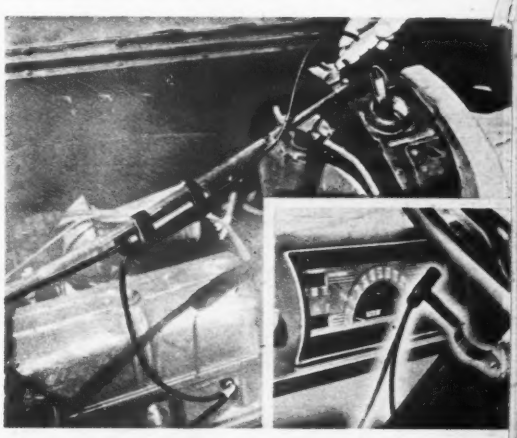


Rusted manifold heat valves can often be loosened by dosing with penetrating oil. Then tap with a hammer, 24 hours later, to break the rust seal.

Bent or damaged fan blades will encourage overheating in ancient vehicles. Loose blades are often the source of mysterious "birdies" and squeaks.



A motor that takes a long time to warm up may be due to a cracked intake manifold. This allows air to enter and leans the carburetor mixture.



Here's one gimmick car dealers aren't hep to yet. It's an indicator that flashes a warning light when the water in the radiator tank gets too low.

easter toys

Ordinary hand tools and a few hours spare time are all you need to make Easter happier for your tykes.

DUCK

BUNNY

CHILDREN have come to expect presents at Easter as well as Christmas. The two toys pictured at the left are "duck soup" pre-Easter projects. For easy work, use seasoned softwood. When finishing them, use gay paints—the brighter the colors, the better.

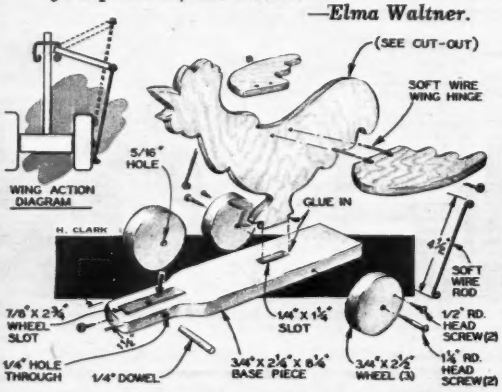
—*Bill Cartwright.*

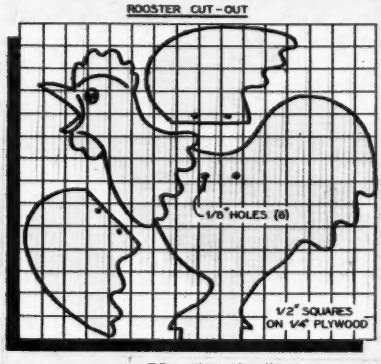
...and if you want action...

THESE three toys, being animated, will appeal to the older child. Ronny Rooster is all a-fluster, flapping vigorously when pulled. A wire actuator runs from a crankscrew on each rear wheel up to a screw eyebolt on each wing. The hopping Bunny is activated by an eccentric rear-leg axle, his body pivoting on a brad driven through the ends of the shaft. The Mamma and Baby Ducks waddle along on eccentric axles that are inserted diagonally, as shown. Soft wire is used to hook the ducks together. Take some pains in assembling these toys. As in the animals above, bright colors are important—and the more detail you paint in, the better.

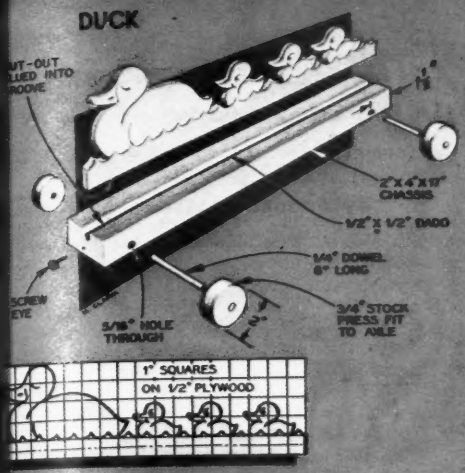
—*Elma Waltner.*

Levers from wings to wheels make the Rooster flap lustily when he is towed across floor.

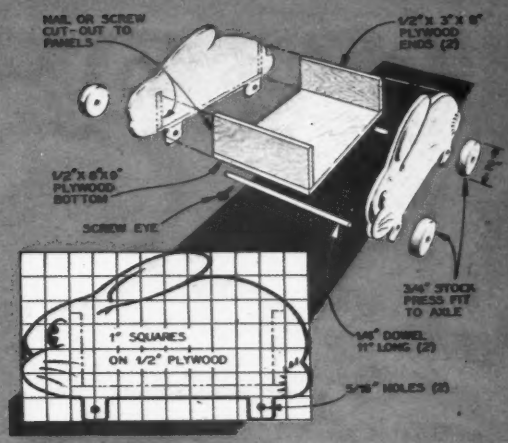




DUCK



BUNNY

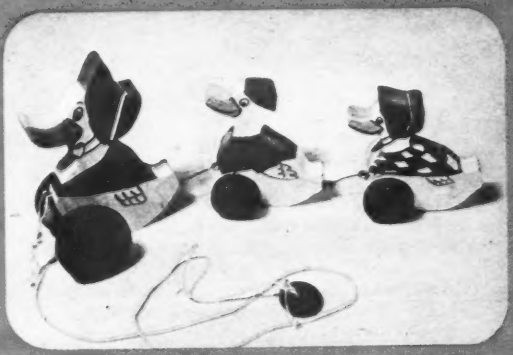


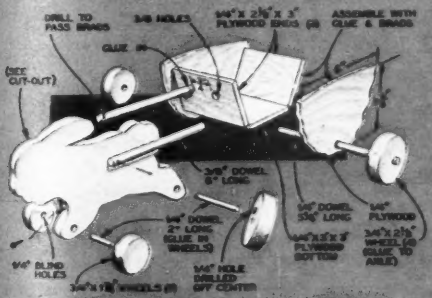
Mark off 1 in. squares and then plot the outlines. Cut out with jig saw. Chassis is 2x4-in. stock.

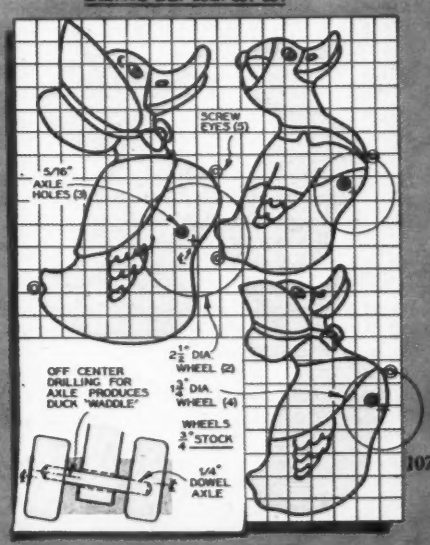
Wheels are ¾-in. stock and axles are ¼-in. dowels. Bore axle holes 5/16 in. for clearance.

Below: This bunny cart, which will hold three or four Easter eggs, should make your child happy.

Below: These three ducks will intrigue any tot and the easy construction will please Dad, too.







CONTROL-LINE WACO Y-3

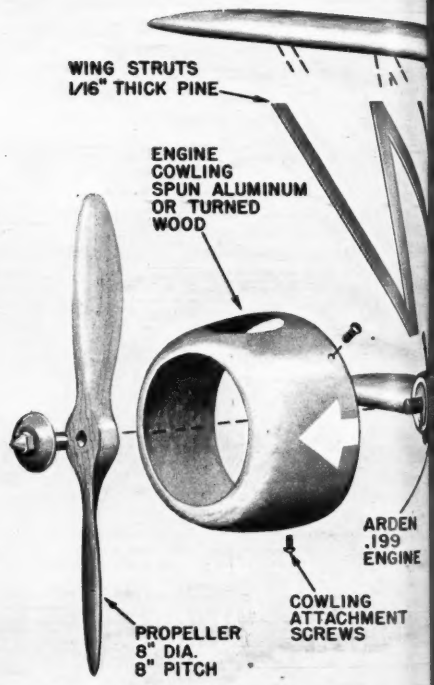
A 24-inch scale control line model for the most famous of air show performers. For .19 to .29 engines.

By Armand Vasquez

MAYBE you've seen a lot of sky-writing and stunt flying at an air show, but have you seen one of the most popular planes that is used for this kind of flying? The Waco F-3 is a standard fixture at any fair-sized airport, and many pilots had their first taste of acrobatic flying in these ships. As a scale model the Waco F-3 makes a swell control-line job and is quite easy to build. Standard construction is employed throughout, and it shouldn't be hard for one who has built a few gliders and rubber-powered jobs. The original model was powered with an Arden .199 but the model will take engines up to .29 displacement equally well.

A word of advice to the fellows who haven't built a gas model before: study the plans carefully, especially the step-by-step sketches. Reading these instructions a few times before starting construction will also help—you'll have a better idea of how the various parts fit together.

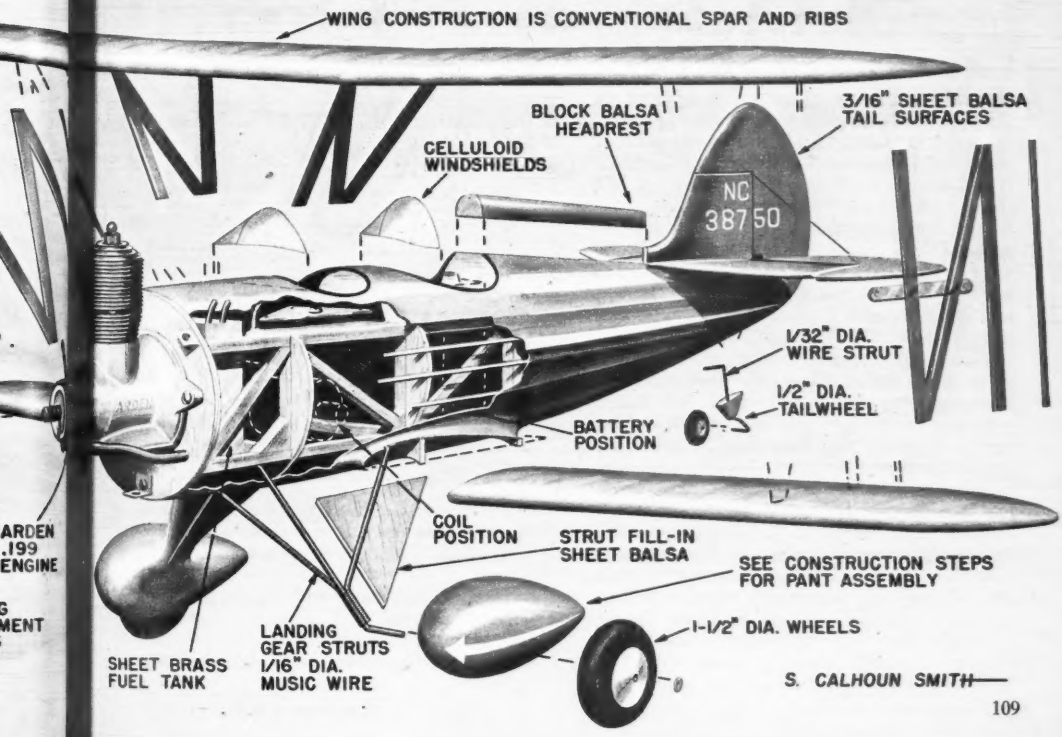
Since the wings are the simplest parts, we'll start on them first. Use a large flat board as a working surface. Fasten the plans down, and then cut out the required number of ribs, using the patterns provided. The center section of the upper wing is built first. You may build the upper wing in three panels and cement it together at the dihedral joint, but greater strength is



obtained by using full-span spars. Cracking the spars slightly for dihedral doesn't take away all the strength. The spars and trailing edge should be of hard balsa, with soft leading edges and wing tips and medium ribs. Note that small blocks of balsa are used between ribs where struts are to be attached. On the upper wing, these blocks should be sanded flush with the bottom surface; on the lower wing panels they should be flush with the top curve of the ribs. Before putting the completed wing panels aside, look at the wings spanwise to see that none of the ribs protrude above the rest. If some do, wrap sandpaper around a flat balsa block and sand them down so *all* the ribs are flush. Just a minute's work, but it pays dividends in smooth, wrinkle-free covering.

Start the fuselage by making two sides of 3/16 in. square hard-balsa. If you want to preserve the plans for possible future use, lay down a sheet of wax paper over the side view before pinning the various parts to the plan. This will slow down the drying of cement in contact with the wax paper, but will produce a neater job. Pin the longerons and uprights down directly

Holding the original model is author Vasquez's daughter—who can fly the job as well as her dad!



over the plan. Build the second side directly over the first and separate them with a double-edged razor blade when thoroughly dry. You can be cutting out the cross-braces while waiting for the fuselage sides to dry completely.

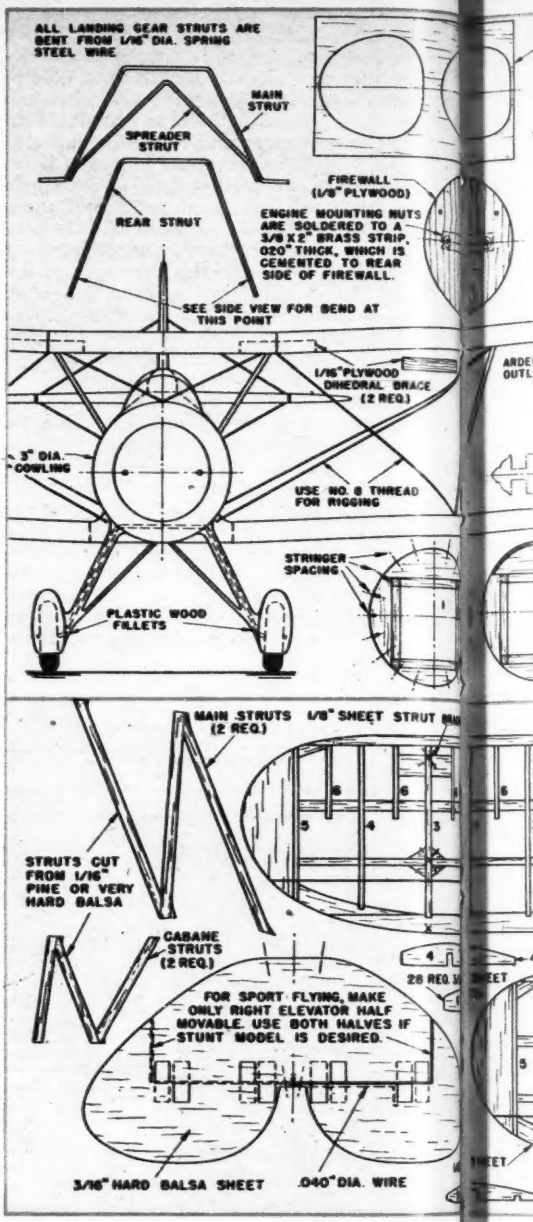
When adding the cross-braces, keep an eye on the squareness of your assembly work—block up the sides with a celluloid drawing triangle to help keep the frame really trued-up. While the basic square fuselage framework is left aside to dry, cut out the formers as shown in the cross-sections (numbered 1 to 6) under the fuselage side view. Mark the $\frac{1}{16}$x⅛ in. stringer positions on formers around the nose (section 1) before cementing the formers in place. Remember to attach the landing gear struts now before stringers are added.

If you are using ignition, it is easier to install the ignition equipment in place now before the stringers are on. The original model was powered with an Arden .199, the battery and coil were placed as shown in the side view. The model balanced at the leading edge of the lower wing. When using heavier engines, compensate for their added weight by positioning the ignition units further backward to achieve the proper balance. Also remember that use of a glow plug Arden .199 will necessitate ballast somewhere in the tail to get the balance right, since the battery and coil won't be used.

Mount the landing gear and bellcrank securely, as these items are subjected to abnormal strains at times. Wrap the landing gear in place with thread and coat the joints with several thin coats of cement. A single thick coating usually turns out sloppy and takes longer to dry, anyway. Mount the bellcrank in the position indicated in the fuselage top view and use washers on both sides of the bellcrank to insure smooth operation. The mounting bolt goes through a piece of $\frac{3}{16}$ in. plywood cemented to the fuselage framework.

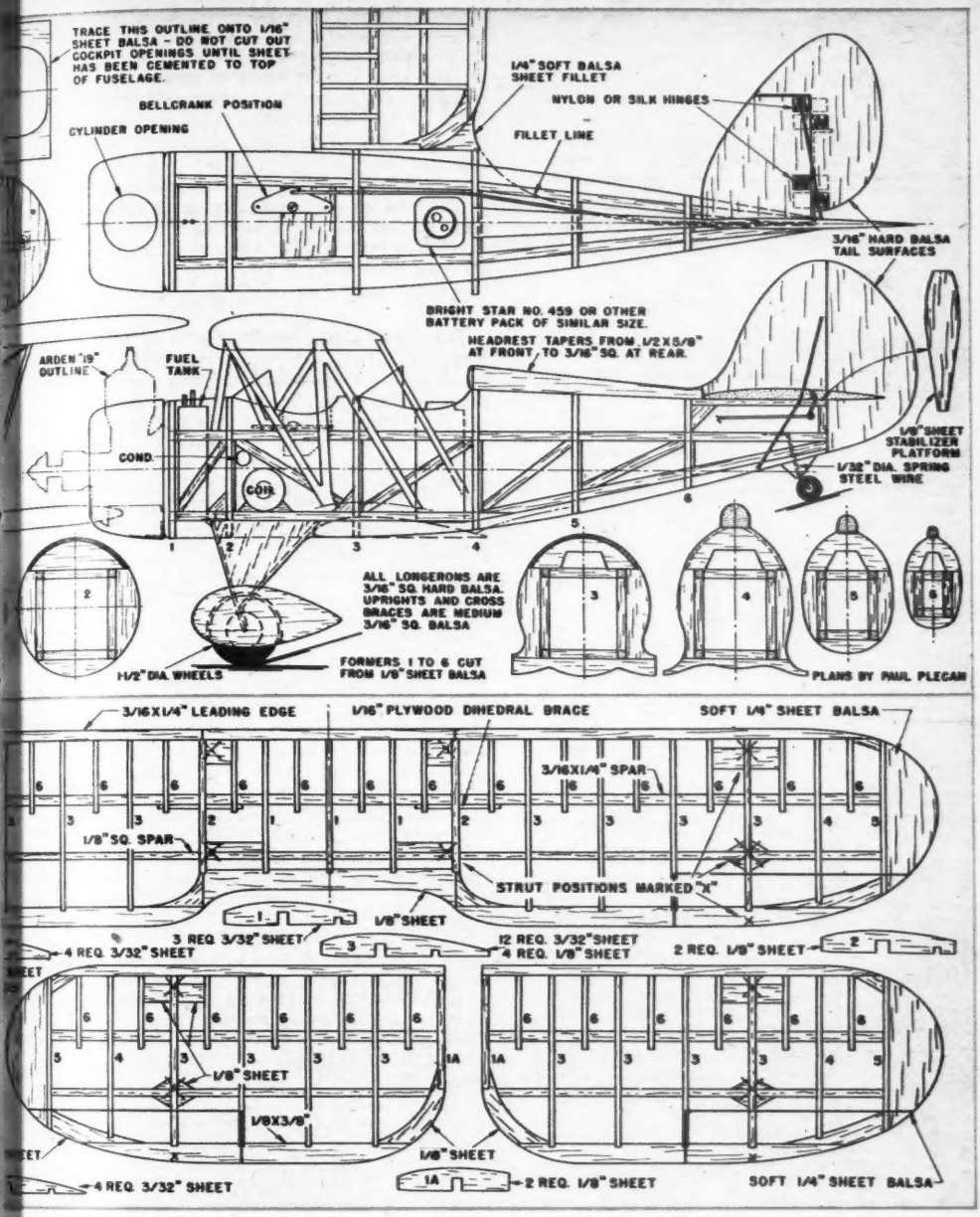
While the cement is drying make the $\frac{3}{16}$ in. sheet tail surfaces. The stabilizer and elevator may be joined with any hinge system you prefer, but be sure it works freely. Cement the stabilizer in place on its platform and complete the control system hookup to the bellcrank. Then check for free control action.

If regular ignition is employed, the firewall can be cemented to the fuselage now so the engine can be mounted. Finish the wiring and check for spark before adding stringers. Many builders forget to check their ignition during the early phases of construction.



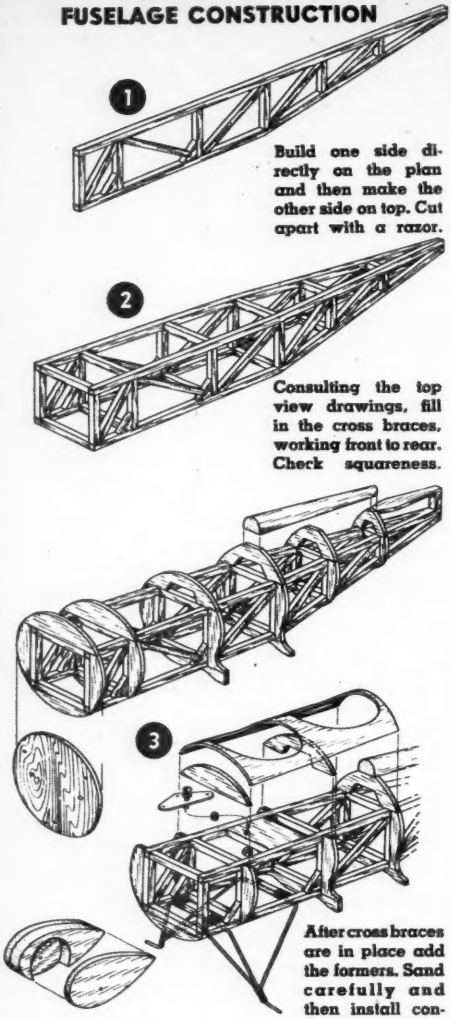
When mounting the engine remember to solder the two mounting nuts to a brass or copper strip which in turn is cemented to the rear of the firewall. This keeps the mounting nuts from working loose from engine vibration.

Stringers are added now, once you are sure that all internal parts are working



satisfactorily. Use hard $\frac{1}{16}$x⅛ in. balsa and lay each strip along the fuselage side in a horizontal line, marking the formers it crosses. Notch the formers and attach stringers, tapering them at the extreme rear end to fair into the tail. Add the side stringers, cementing one to each side at a time, as the fuselage may warp slightly if all the stringers are added to one side alone. Note that the area around the cockpits is covered with $\frac{1}{16}$ in. sheet balsa. *Don't* cut out the openings in it before it is in place. If you do, the sheet will be weak at the center and will undoubtedly crack before you have it cemented in place. You'll want to get the tank in place before adding the

FUSELAGE CONSTRUCTION



Build one side directly on the plan and then make the other side on top. Cut apart with a razor.

Consulting the top view drawings, fill in the cross braces, working front to rear. Check squareness.

After cross braces are in place add the formers. Sand carefully and then install controls, cockpit covering and gear.

short stringers on top of the nose. A satisfactory tank can be made of shim brass or bought ready-made at the local hobby shop. If you make your own, remember that *two* short tubes are needed on top—one for filling and the other for overflow. The fuel feed line leading from the bottom of the tank to the needle-valve on the engine should be positioned so that it will drain the tank nearly bone-dry. Remember, the fuel will be forced to the side of the tank *away* from you when the model is flying.

The block balsa headrest can be added now, or, if you desire, put on after the fuselage has been covered. Once you have all the stringers on the fuselage, sight along the length of the fuselage to see that there are no abrupt bends or unequal spacing of stringers. Re-notch wherever necessary, and by using a sanding block that is about ¾ in. diameter, sandpaper away the formers between stringers. This will make for a neater covering job.

Minor items can be tended to now, such as adding the tail-wheel, and making the simple sandwich-type wheel-pants. Use three layers of $\frac{1}{16}$ in. sheet cemented together cross-grained for the landing gear struts; use small patches of silk or thin cloth to reinforce the bonding between the balsa and wire. Plastic Wood, a mixture of sawdust and cement, or any commercial plastic filler can be used to form the fillets in the landing gear. You'll have to lay the job aside to allow the fillets plenty of time to dry, but the time can be used to cover the model. Silk is best, though some modellers like nylon for [*Continued on page* 132]

FULL SIZE PLANS

will make building easier. Send 50 cents for your set to: MECHANIX ILLUSTRATED Plans Service, Fawcett Building, Greenwich, Connecticut. Please specify Plan No. 400.

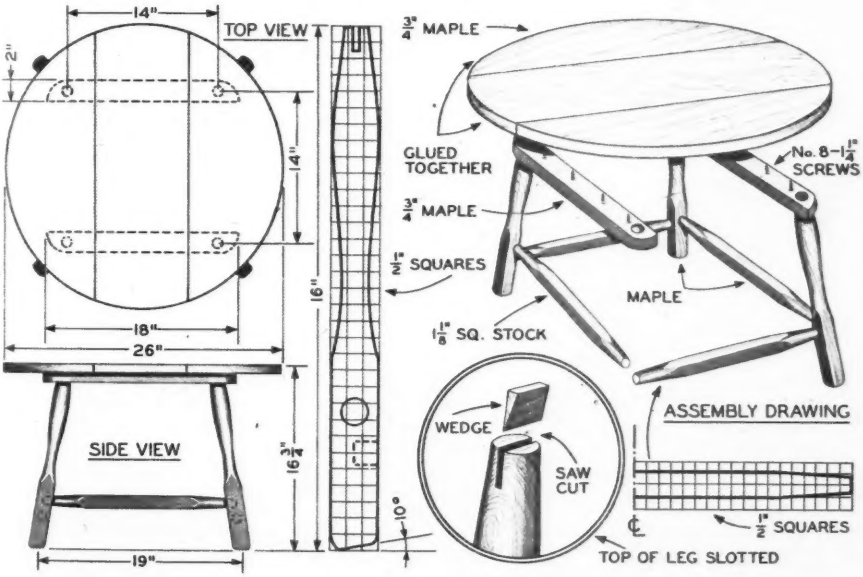
For good looks and good performance you'll find your Waco model hard to beat.

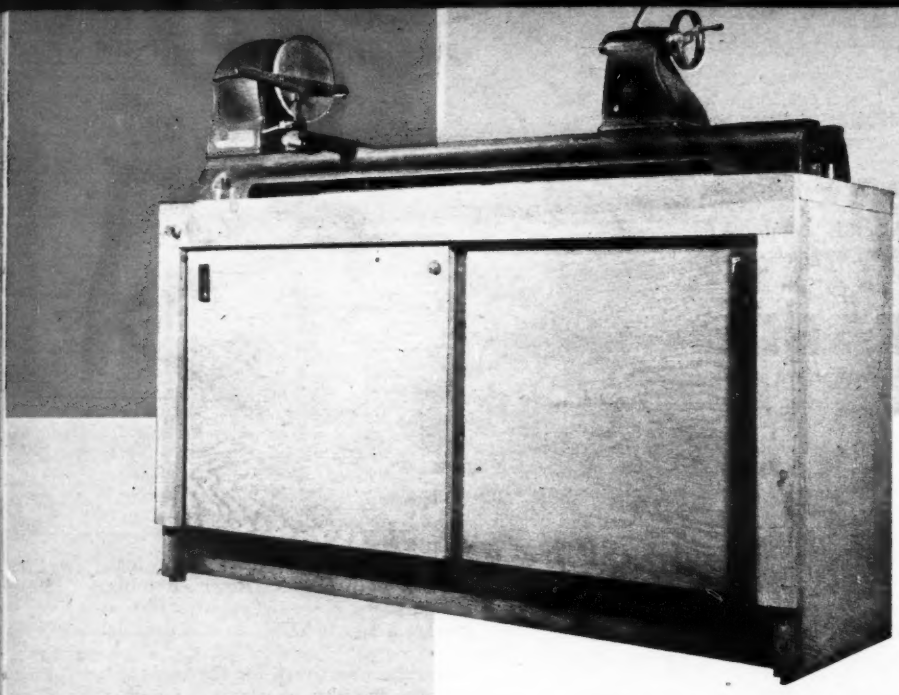
JIFFY COFFEE TABLE

HERE'S a neat little job that, even though you can't quite make it in a jiffy as indicated in the title, will still be one of the quickest projects you ever turned out in the furniture line. While maple is specified in the drawing, mahogany can be substituted if desired.

The top consists of three glued-together pieces and two cleats. Bore the latter for the legs, which can be either turned on a lathe or, for an informal, primitive effect, shaped with a spokeshave, a rasp, and sandpaper. Each leg is slotted at the top and a wedge is inserted; then the legs are driven into the holes in the cleats. The stretchers fit into holes bored in the legs. Glue is used in all joints. After assembly, wipe the excess glue away, otherwise it will impart a spotty effect to the finished piece.

Perhaps the best finish for the table is a natural one, the aim of which is to show the grain of the wood. Maple should be stained. After the stain has dried, sand and lay a thin coat of shellac. Allow to dry and again sand lightly; then apply three coats of ordinary paste furniture wax, rubbing between coats.—*Hi Sibley*

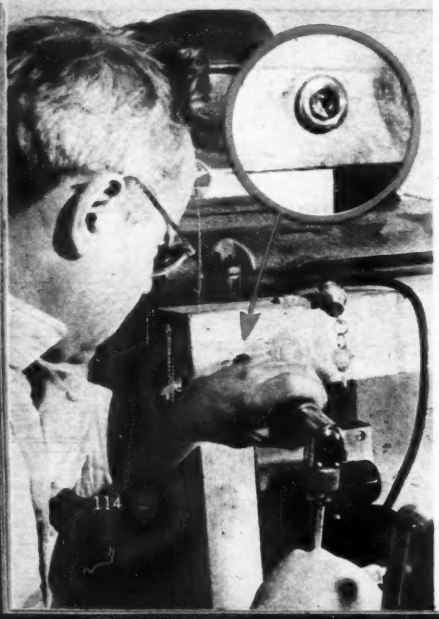




woodworking LATHE CABINET

When any craftsman deserving of the name shells out his hard-earned dough for a lathe, he'll want to make a cabinet worthy of the tool.

An ignition lock prevents use of the power tool by unauthorized persons or kids who might hurt themselves.

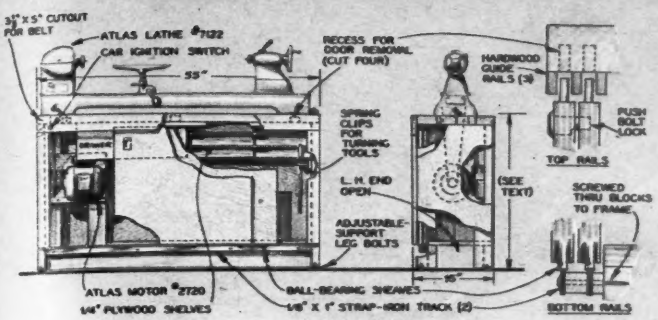


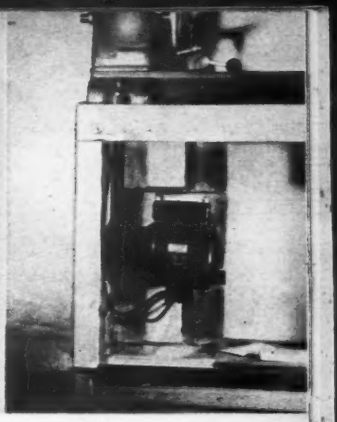
By Harrison Neustadt

THE space available for power tools in the average workshop is limited; so it should be utilized to the best advantage. Makeshift stands are just what their name implies and are usually space wasters. In this design, undesirable details have been carefully considered and eliminated. The cabinet rigidly supports the lathe, houses the motor in a clean, ventilated space below the tool, and provides ample storage behind sliding doors for accessories, sandpaper, and incomplete projects. Locks are provided to safeguard the contents.

Common two-by-fours are glued and nailed together to form the framework. Cover the back and righthand end with ¼-in. plywood. The motor mount is made up from strap iron and a loose-pin hinge, as shown. Set the lathe in place, add the belt, and adjust for proper tension before securing the motor. Two pieces of ¾-in. plywood are required for the sliding doors. Install the hardware and attach the tracks to the cabinet as indicated.

Bore a hole in the upper lefthand front of the



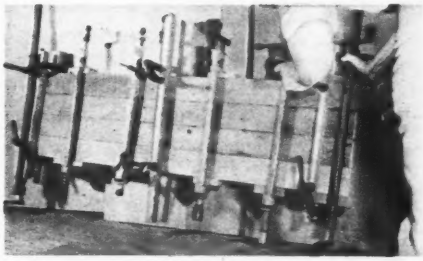


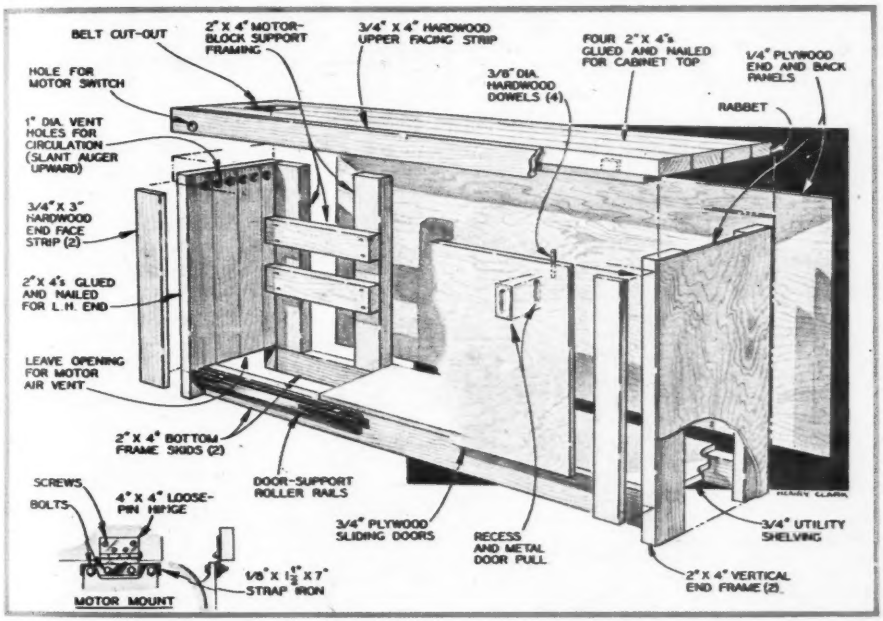
cabinet and install the ignition switch, connecting one end to the "hot" lead from the house circuit and the other to the motor. Sandpaper bins are made from ¼-in. plywood. A drawer of conventional construction takes small lathe accessories such as chucks, centers, taps, and drills.

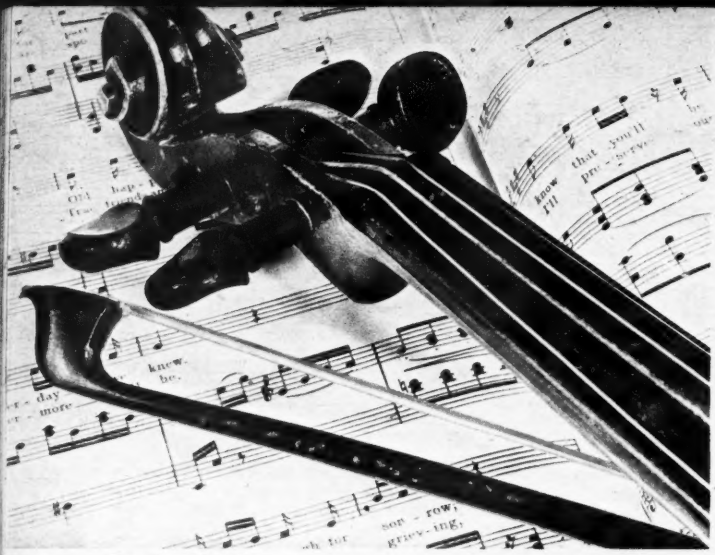
An inexpensive finish consists of ¼ lb. of melted paraffin and a quart of turpentine. One coat should be sufficient to protect the wood, but a second coat can be applied, if desired, almost immediately after the first.

To shift the belt from one pulley to another, raise motor with your right hand and move belt with your other hand. •

Make the top and the lefthand end from glued-together two-by-fours, using plenty of clamps when gluing each part up, as shown in the photo below.



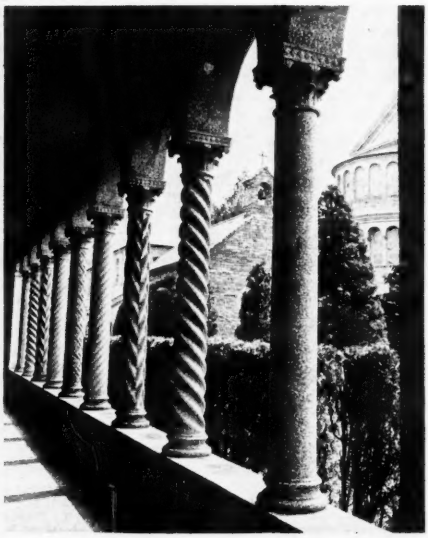




Monthly Photo Contest

Please put your name, address and picture-taking data on back of each print. Wrap with cardboard stiffeners and enclose a self-addressed stamped envelope or postage for return of unused photos. Prize-winning pictures are not returned. Judges are MI Editors. Duplicate prizes awarded in case of tie. Address: Monthly Photo Contest Editor, MECHANIX ILLUSTRATED, 67 W. 44th Street, New York 18, N. Y.

First Prize ($10.00) .....The Old Refrain
Walter Chandoha, Astoria, N.Y. Taken with slow pan film and photofloods.



$5.00 Award .....Jes' Fishin'
A No. 5 flash was used as a fill-in light by E. J. Eisenmeier of Baltimore. Taken with a Linhof camera, Ansco Supreme.

$5.00 Award..Franciscan Pillars
A one-second time exposure by R. O. Moore of Mt. Rainier; Speed Graphic, f-16, Super XX.

$5.00 Award .....Lunch
Arthur Adams of Whittier, Cal., used a 4x5 camera and Super XX film for this shot.

photo handies

Prevent your prints from slipping by first placing a blotter or towel over the ferrotype plate before applying the roller. This absorbs the excess moisture on plate.

QUESTION BOX

How can I dry negatives in a hurry? George Clinton, Portland, Ind.

The best way to dry negatives rapidly would be by means of a blast of warm air. However, make certain that the air is filtered, otherwise particles of dust may imbed themselves in the soft emulsion.

What kind of a synchronizer do I need for a self-setting shutter? Jimmy Wilhelm, Benton, Mo.

Get a Kalart Passive synchronizer.

Can I use the lens on my No. 2C Folding Autographic Brownie for enlarging? Don Korte, Cresskill, N. J.

Yes.

How can I prevent my prints from curling? James H. Mueller, Parkston, S. D.

Soak them in a glycerine solution; about 1 oz. to a quart of water.

I have an f-9.0, 16 cm. lens. What is its focal length? What negative will it cover? Is it good for enlarging? Burton Scudney, Chelsea, Mass.

Your 6-in. lens can enlarge 3¼x4¼ negatives.

Where can I get film for my Tenax camera? Joseph G. Conroy, Springfield, O.

Try Carl Zeiss of New York City.

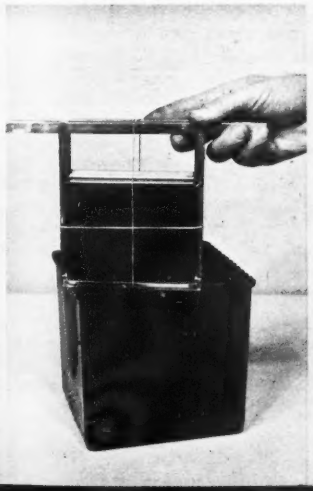
What is the focal length of the lens on my No. 4 Pony Premo camera? O. E. Campbell, Lima, O.

About 6½ in.

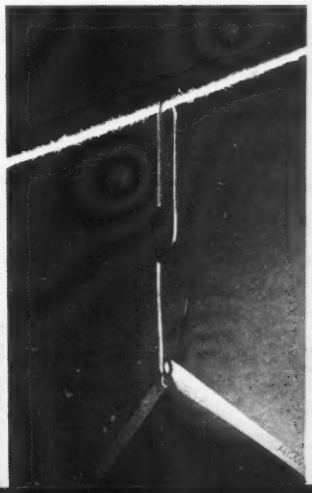
Can I use aluminum bread pans for developing trays? David Johnson, Pennock, Minn.

Aluminum utensils should never be used for developing film or paper. The developer will attack this material. Stainless steel, porcelain, or hard rubber trays are best.

Several cut film hangers can be handled as a unit during developing if they are tied together with a couple of elastics before dunking in a developer.



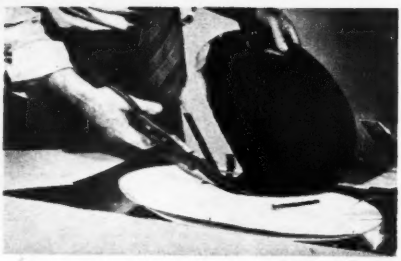
You can hang films up to dry by means of a paper clip by first passing it through a hole punched in one end of the film. Use a stationer's paper punch.



Metal clothespins can be used to keep your focusing cloth from blowing away when working outdoors. See photo below.

MI Picture Projector

Here's the device MI readers have been asking for. Instead of taking slides, it accepts pictures and projects them on the wall.



A paper or cardboard pattern should be used when cutting out the two sheet metal sides.

Bolting a side piece to one of the U-shaped iron bars which bear the weight of projector.

By Ken Murray

THE MI Projector will screen a brilliant enlarged image of anything that can be written or printed, including magazine illustrations, postcards and photographs. The most outstanding feature is a new method of illumination. According to the picture brilliancy desired, from two to eight G. E. reflector type showcase lamps are mounted so that they are in close proximity to the copy. As these lamps have built-in reflectors, even illumination is assured. This arrangement compares favorably with commercial projectors which use a single 500-watt lamp, a special spherical reflector and an additional reflector on the opposite side of the copy.

Insertion and removal of copy is easy. Light pressure on a convenient arm depresses the copy holder, which immediately springs back into place after the copy has been inserted and centered. A 5-in. square

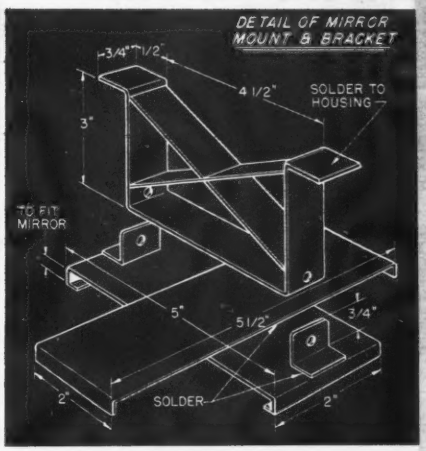
section of any copy can be screened, and when the copy is smaller it can be held flat with a sheet of clear glass. The holder is self-leveling, regardless of the thickness of the copy material.

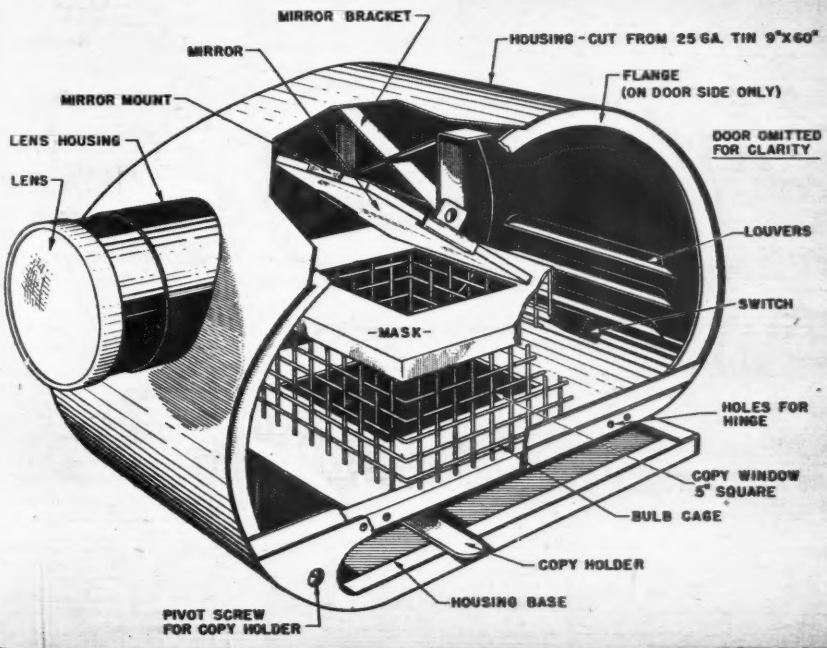
The complete lens unit illustrated was purchased from the Keystone Mfg. Co., Boston, Mass., for $6.50. This company also sells the front-surface mirror required for $3.50. If you wish to build your own lens system from single components, the inexpensive lenses sold by Edmund Salvage Co., Audubon, N. J., are a good buy.

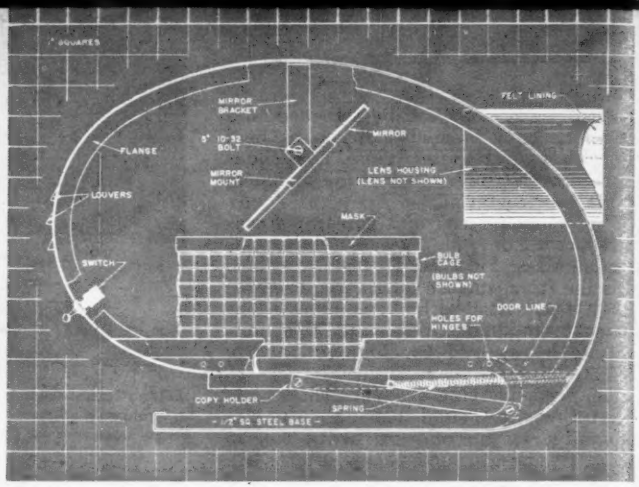
The accompanying drawings show sizes for cutting the several housing parts. Use galvanized or tin plate of about No. 25 gauge. It is best to make paper patterns before cutting the hinged door and the opposite side piece. A flange is used on the door side of the housing as a light seal. The hinges should have loose pins for convenience in attaching and removing the door. The housing base consists of two ½-in. square iron bars, each bent into a U. Holes are drilled where indicated for bolting to the housing.

The curved hood or back of the housing is a sheet 9x60 in., with a 5x5 in. opening cut to make the copy window, and a pear-shaped opening for the lens housing. The latter opening will have a round contour when the piece is curved to the lines of the sides. Make three parallel cuts across the piece and pound them out into ventilating louvers with a set-up like that shown in the picture. One of the iron base pieces is

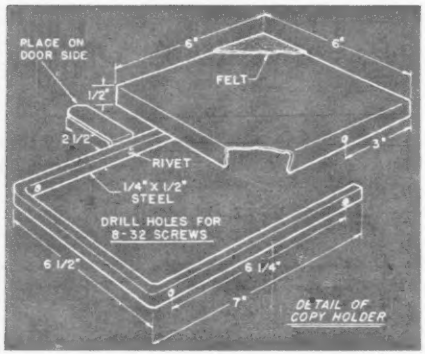
Bolting hinges to door flange. The flange serves as a light baffle when the door is closed. Hinges should have loose pins for convenience in attaching door.

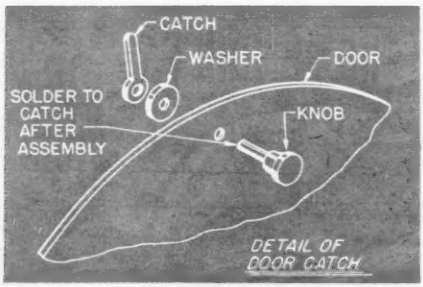


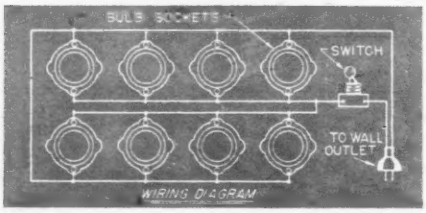




Shaping the ventilating louvers. Make certain that they face in the right direction, downwards.







used as an anvil. Be sure that the louvers are made in the right direction.

The easiest way of assembling the parts would be to use bolts or rivets, but a more streamlined appearance is given when they are soldered, photo No. 1. Use plenty of solder and file or grind off the excess. A wrinkle-enamel finish will hide any slight unevenness. The housing for the lens tube unit can be a metal can, cut down and soldered with a lap joint and then filed for smoothness. As a form use the lens tube itself, covered with one thickness of thin felt. Afterwards glue the felt inside the housing with Cascorez or a similar adhesive. Introduce the lens housing into the pear-shaped opening of the hood and grind the opening, photo No. 2, until it fits perfectly. Solder as in photo No. 3 with very little of the tube projecting beyond the projector housing.

The face of the front-silvered mirror must never be touched with the hands, and care in handling is required to avoid scratches. Photo No. 4 shows the metal bracket in which it is mounted. Before soldering the bracket in the top of the projector housing, make accurate locating marks. When the mirror is in the bracket and set at an angle of 45° to the lens, the center of the mirror must be opposite the center of the lens and exactly over the center of the copy window in the bottom of the housing. The positioning can be seen in photo No. 8.

Before proceeding further, paint the inside of the housing with a flat black lacquer or paint, photo No. 5. If this is not done, the mirror will pick up reflected light which would project as side flare on the screen.

The copy holder assembly, photo No. 6, consists of a square of aluminum from a cookie sheet, with the edges turned over, a mounting bracket [*Continued on page* 142]

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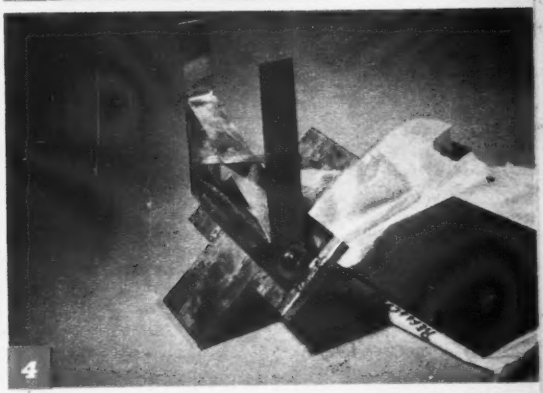
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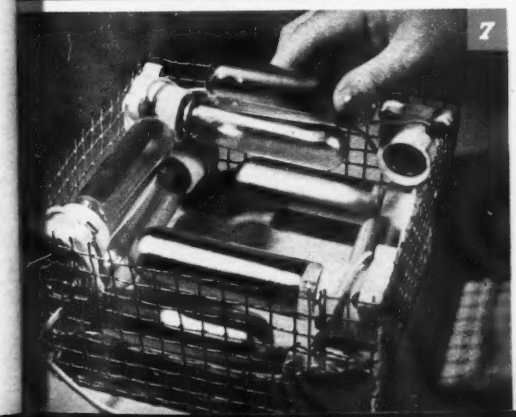
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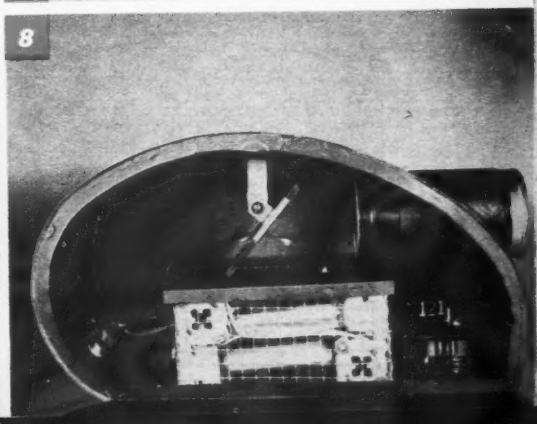
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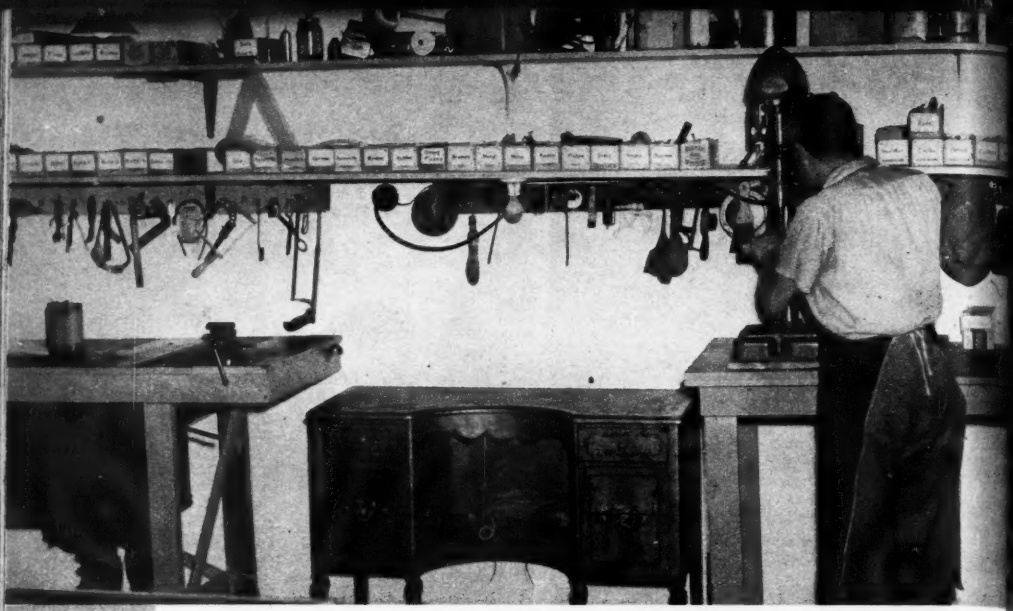


Junk Shop To Workshop

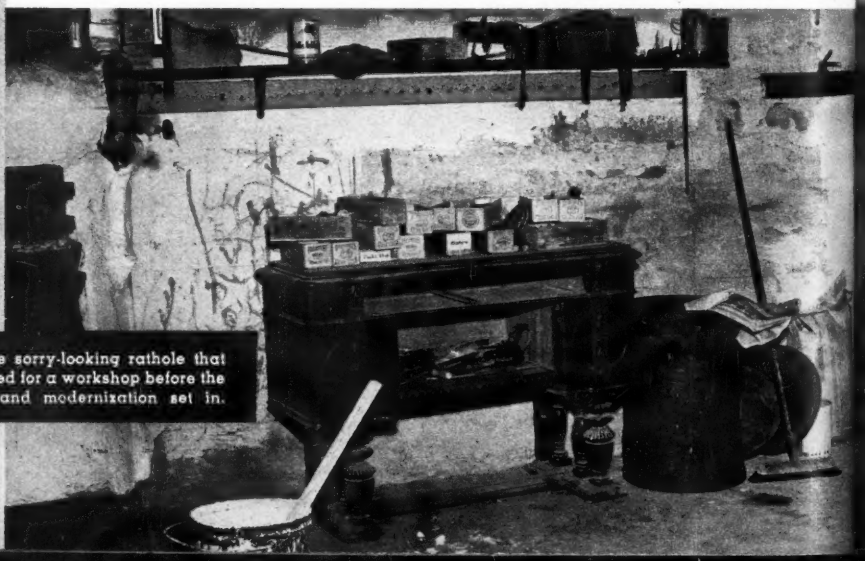
Don't envy the man with a workshop—buckle down, clean out the cellar and you'll have one too.

By Robert Brightman

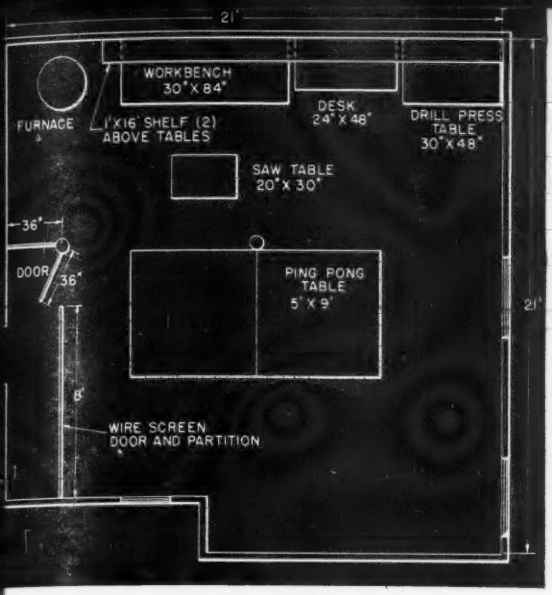
HOW often have you said to yourself when admiring someone's handicraft, "Yes, but he's got a workshop; all I've got is a dirty cellar."

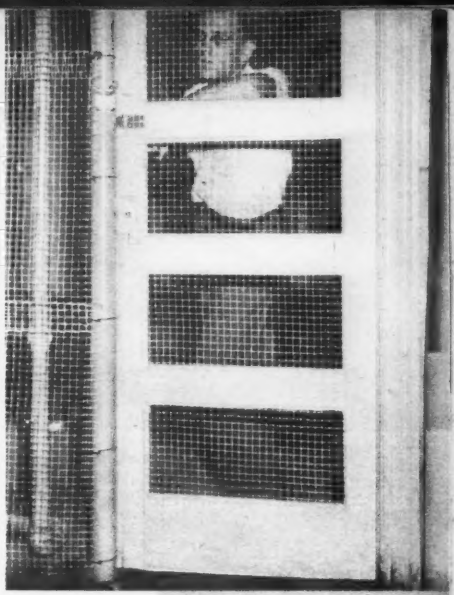
If that is so, take a peek at the large photograph at the bottom of this page. Messy, isn't it? Well, that's exactly what the workshop pictured at the top of this page looked like before several Saturdays and Sundays were applied to it.

The first step, was to clear out all the junk and rip off all existing nondescript shelving. Then the walls were given two coats of whitewash. A double handful of salt and a couple of ounces of



This is the sorry-looking rathole that once passed for a workshop before the cleaning and modernization set in.



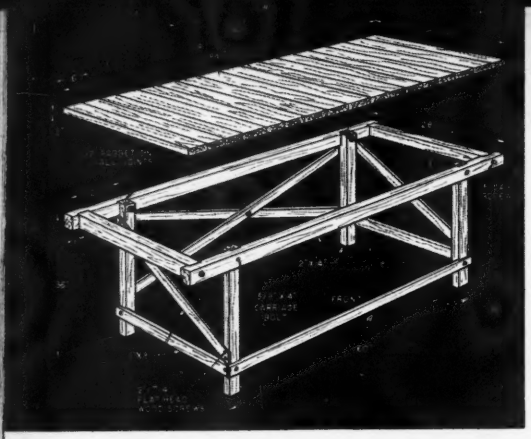


As a means of safeguarding equipment from children and allowing light in other parts of the cellar, hardware cloth is used for walls and door.

alum added to each bucket of whitewash will set it so that it will not rub off when dry. The next step was to make a sketch of the floor area and determine the best places for benches, shelves and tools. You don't have to be too ambitious at first. A bench, a vise and a set of hand tools will enable you to do plenty. After your muscles have been toughened by the use of a saw and hand drill, you will probably want to put them back in their original condition by using a bench saw and drill press. Well and good, but this can come later.

The first item to be made was the workbench; the working dimensions are shown on page 124. This bench, 7 ft. long, was designed so that the cabinet shown at the bottom of page 122 would fit underneath it and serve as drawer space. Most workbenches are too low. If you are of average height, your workbench should be 36 in. high. This workbench

Plenty of electrical outlets make radio work a cinch instead of a chore. Use approved BX or conduit wiring methods.



How the large workbench is put together. The small one for the drill press is similarly made.

An old refrigerator motor was converted into a handy buffer by the addition of an arbor.

Above: An important piece of equipment is the bench saw. Place it in the center of the shop.

Below: Space between workbenches houses a small desk. Useful when working on small projects.

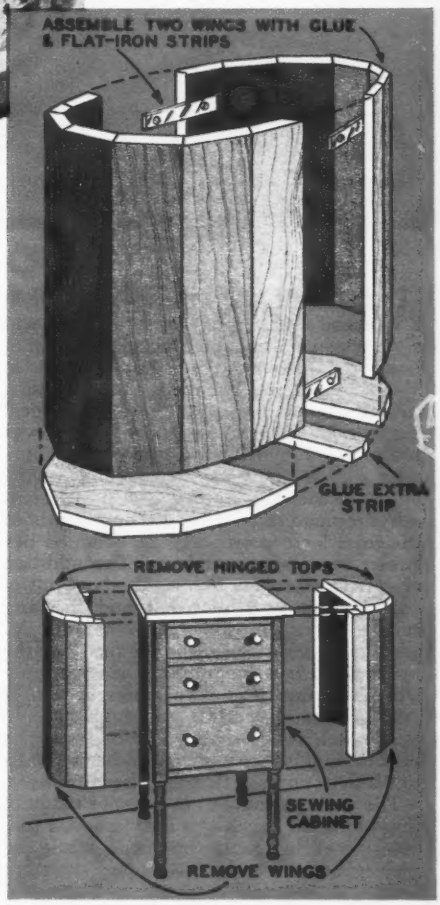
proved inadequate after a while and a second workbench was made, 4 ft. long, which was placed at the opposite end of the shop. The two are separated by an antiquated desk which was bequeathed by a friend. The total workbench space then consists of 15 ft. The desk is extremely handy for those operations that can be carried on in a sitting position.

As a means of safeguarding the equipment from the assorted small fry of the neighborhood (also the kids from the power tools) and, at the same time, allowing light to enter other parts of the cellar, all partitions were torn down and replaced with ⅝ in. hardware cloth. Note the use of a *Tel-O-Post* which serves as a jamb.

Plenty of electrical outlets were installed so that adequate power would be available as power tools were added to the shop. The first addition was a Delta bench saw and as soon as the versatility of this tool was demonstrated, an Atlas drill press was also installed. •

CONVERTED SEWING CABINET

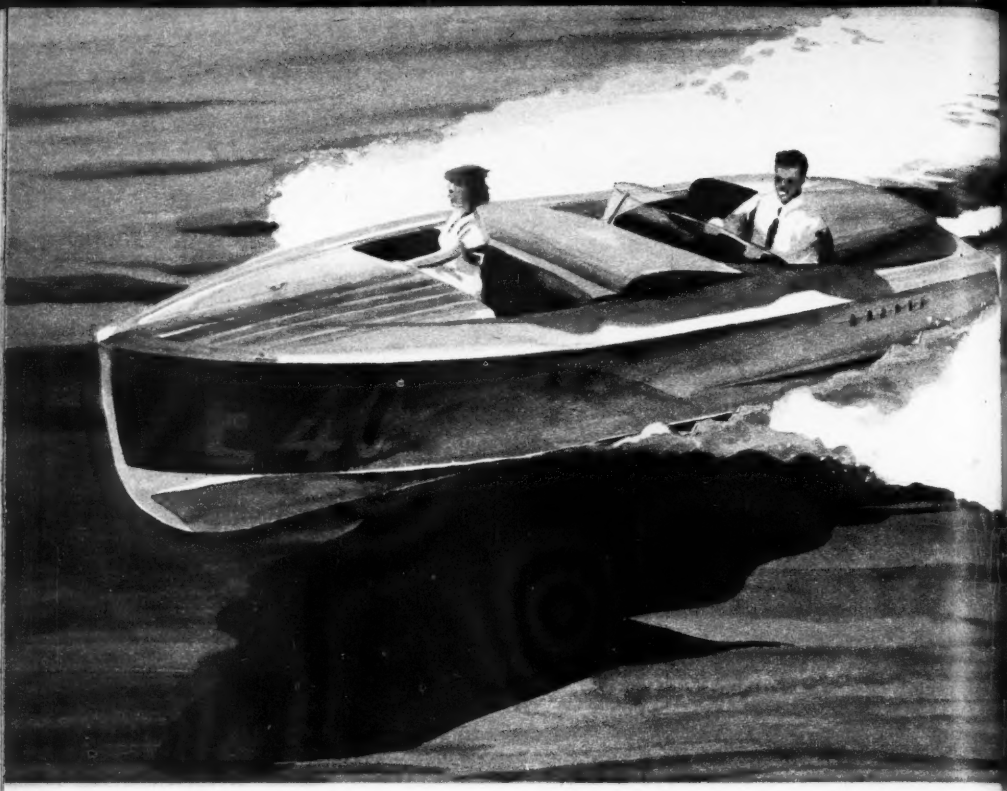
Two handsome pieces can be made from one that is not too attractive.



BACK in the Turbulent Twenties a tidal wave of Martha Washington sewing cabinets was loosed upon the land. One was invariably included in the popular deal of that time wherein you could get a whole house furnished for 500 bucks. While the table itself was handy for sewing, the wings usually proved to be catch-all nuisances.

A good way to salvage the table and still use the wings is suggested here. Carefully remove the two wings, glue them together, and further fasten with two screw-secured lengths of flatbar. Or, if your shop is equipped for such work, a thin spline in each glued joint would be better. Next, take the two hinged tops, add an extra piece of wood between them, and edge-glue together. Place the wing assembly on the thus-formed base and trace around it; then saw the base to shape. A few flathead screws through the base into the wing assembly complete the piece. After cleaning and refinishing, attach an attractive print with rubber cement. This adhesive won't cause the paper to wrinkle. The capacious wastepaper basket thus contrived is good-looking and will prove very serviceable.

The table can be used for a bedside table, a typing table, an end table, a sewing table, or in many other ways.—*Norbert Engels*



ALTHOUGH it's true that maximum speed with any given horsepower will always come from the hydroplane type of boat, it's likewise true that interest in V-bottom racing runabouts is increasing rather than falling off. There are logical reasons for this. As anyone who has ever ridden in a hydroplane knows, it is uncomfortable and its passenger-carrying ability is strictly limited. The designer of a hydroplane must arrange the weights so the total load is properly apportioned between the planing surfaces. The addition of extra passengers throws the boat out of balance, destroys her speed, and, in many cases, makes her difficult to handle. An additional disadvantage is the fact that the hydroplane can be properly steered only when running at relatively high speeds. If you have to slow down for rough water—or to catch your breath—you find that the boat is sluggish, refuses to handle, and fails to lift over any sea that may be running.

The racing runabout overcomes many of these disadvantages at a cost in speed that many feel is amply justified. While no racing boat can be an ideal rough-weather craft, racing runabouts can be relatively comfortable and can be used for purposes other than racing. The American Power Boat Association (APBA), the organization that regulates power-boat racing in this country, has done a great deal to foster the racing of high-speed runabouts. *Spanker* is an excellent example of what their rules have produced in the way of a boat having extreme speed, yet one that is able to stand a moderate amount of rough water and to carry up to four passengers.

Spanker was designed to fit APBA Class E racing-runabout regulations. These rules limit the engine to not over 245 cu. in. cylinder displacement. Virtually all of the automobile conversions and the majority of the popular marine motors are small enough to qualify. However, it was assumed that some builders would want to use *Spanker* for general high-speed pleasure work; so her design was prepared to take engines of a wider power range than would normally be used for racing.

Note that there are two curves, on her speed-power graph (Fig. 2), one for a displacement of 1,700 lbs. and the other for a displacement of 2,140 lbs. If built in ac-

SPANKER... A Racing Runabout

If you want an ultramodern boat with flashing speed for either pleasure or racing, this is it!

By Gerald Taylor White
Design by Westlawn Associates

FIG. 1

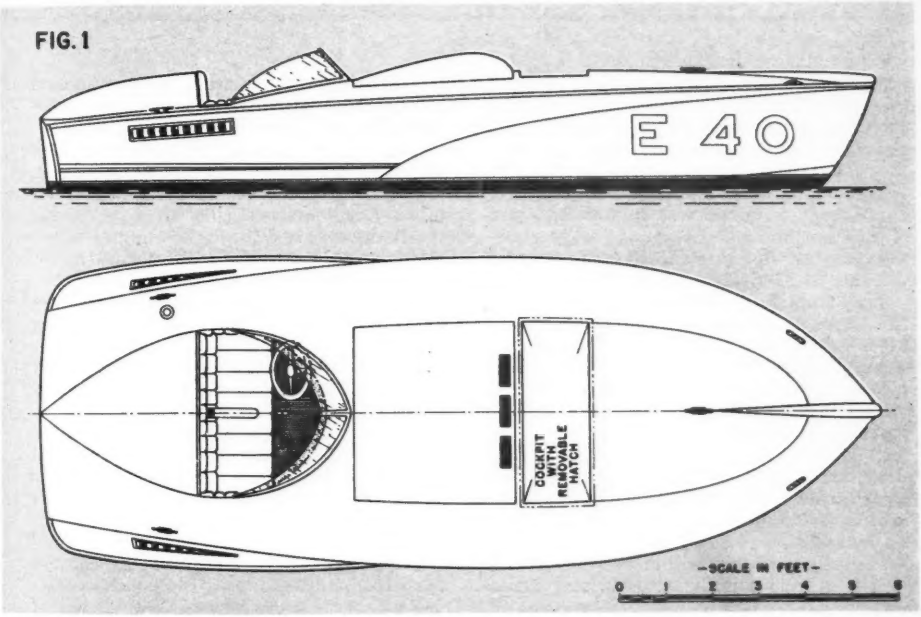
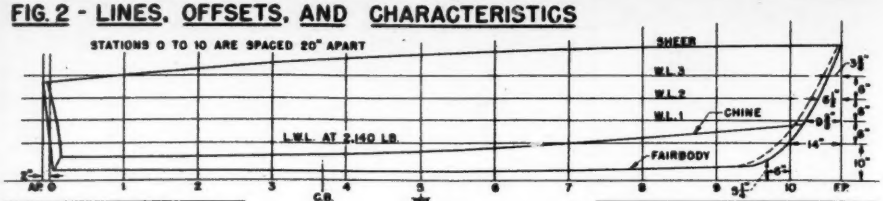


FIG. 2 - LINES, OFFSETS, AND CHARACTERISTICS

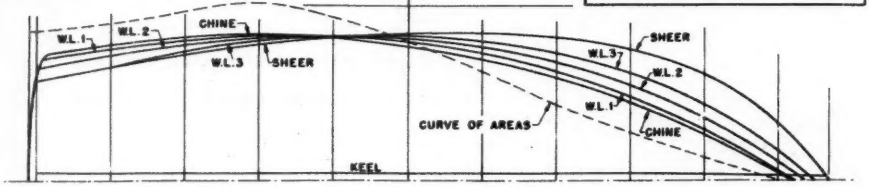


CHARACTERISTICS

BLOCK COEFFICIENT — — — 51 %
PRISMATIC COEFFICIENT — — 64%
FINENESS COEFFICIENT — — 75%
CENTER OF BUOYANCY - 2.19' AFT OF ⊠
AFTERBODY DIHEDRAL — — 166°
WATERPLANE AREA — — 80 SQ. FT.
TRANSOM RADIUS — — — 18"-0"
DECK CAMBER — — — 13"-1½"

CHARACTERISTICS

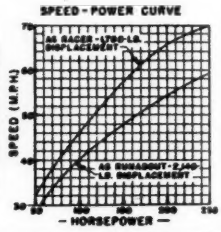
LENGTH OVER ALL — — — — 18'-0"
LENGTH AT WATERLINE — — — 16'-8"
BEAM — — — — — — 6'-6"
DRAFT, WITHOUT APPENDAGES — — — 7½"
DISPLACEMENT (REGULAR) — — 2,140 LB.
DISPLACEMENT (RACING) — — 1,700 LB.
MOMENT TO CHANGE TRIM 1" — — 178 FT. LB.
LBS.-PER-INCH IMMERSION — — — 427 LB.
WETTED SURFACE — — — — 87 SQ. FT.



— SCALE IN FEET —

STATION	A.P.	0	1	2	3	4	5	6	7	8	9	10	F.P.
BASE TO FAIRBODY	0-2-4	— STRAIGHT LINE —					0-2-4	0-2-5	0-2-7	0-3-2	0-3-6+	0-4-3	0-4-6+
BASE TO CHINE	0-5-7+	0-5-7+	0-6-1	0-6-3+	0-6-5+	0-7-1	0-7-6	0-8-5+	0-9-6+	0-11-2	1-0-6+	1-2-4+	1-3-5+
BASE TO SHEER	2-2-0	2-2-1+	2-4-0	2-5-5	2-7-0+	2-8-3+	2-9-4+	2-10-3+	2-11-0	2-11-4	2-11-6	3-0-0	3-0-0+
℄ TO CHINE	2-8-5	2-8-7+	2-11-6	3-1-6	3-2-4	3-1-5	2-11-4	2-7-7+	2-3-1	1-8-6	1-0-2	0-1-7+	
℄ TO W.L. 1	2-7-3+	2-7-6	2-10-4	3-0-5	3-2-0	3-2-0+	3-0-5	2-9-3+	2-5-0	1-10-4	1-1-6	0-2-5	
℄ TO W.L. 2	2-5-4+	2-5-7	2-9-0	2-11-5	3-1-4+	3-2-3	3-1-4+	2-11-2	2-7-1+	2-1-0+	1-4-4	0-5-0	
℄ TO W.L. 3	1-11-7+	2-0-4	2-5-6	2-9-6	3-0-4	3-2-0	3-2-1	3-0-6+	2-9-6	2-4-3	1-8-1+	0-7-0	
℄ TO SHEER	2-1-7	2-2-2	2-5-6	2-8-7+	2-11-6	3-1-6	3-3-0	3-3-1	3-1-7+	2-10-6+	2-4-1	1-3-3+	

OFFSETS ARE GIVEN IN FEET, INCHES, AND EIGHTHS OF INCHES (TO OUTSIDE OF PLANKING).



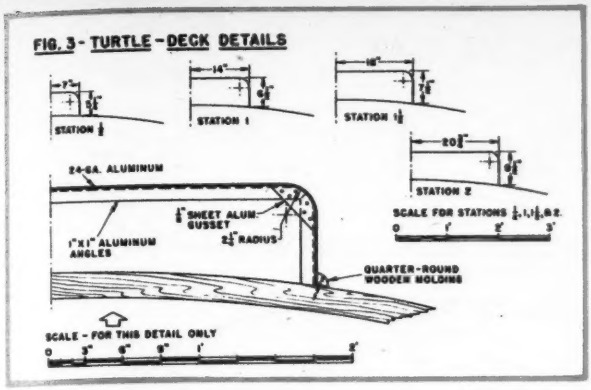
cordance with the plans and specifications and fitted with a light racing engine, the boat should closely approximate the speeds shown by the upper of the two curves. With an 80-hp. engine, for example, she will make 40 m.p.h.; for a mile-a-minute speed, the output required will be 175 hp.; and if you can find a light enough engine developing 250 hp., you can look for a speed of close to 70 m.p.h.

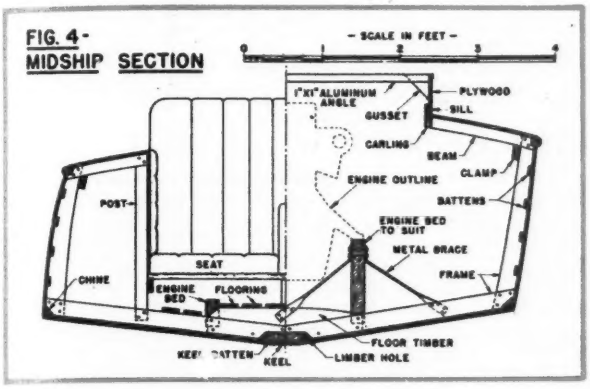
Now note how additional weight slows down the boat. Increasing the load by a bit over 400 lbs.—installing a heavier engine, carrying extra passengers, or using more rugged construction—makes a difference with 100 hp. of six m.p.h. With 200 hp., she would be almost 12 m.p.h. slower, just because of the increase in weight. This illustrates the vital importance of holding weights down in a racing job. It also illustrates the mathematical care that went into the design of *Spanker*.

One thing should be pointed out before you give serious thought to building her—no changes whatsoever should be made in the shape, the dimensions, the locations of the weights, or, in fact, any part of the design. Experience has shown that nine-tenths of the failures in amateur-built boats come from attempts to alter designs. It may seem like a simple thing to add another plank to each side, thus increasing the freeboard, or to move the engine ahead a foot or so, providing more cockpit room, but such changes will ruin the boat.

Building *Spanker* is not a simple job for a man with no previous boatbuilding experience. Not that her construction is unduly complicated, but rather that any high-speed craft is subjected to tremendous strains when running. A poorly made joint will be a weak spot when the boat "works" at top speed, giving a little and gradually causing other parts to loosen until you have a boat that constantly leaks and eventually has to be broken up.

Her specifications call mostly for lumber of the conventional type. Plywood is specified wherever it can be used. Don't attempt





SPECIFICATIONS

Length O.A.	18 ft. 0	in.
Length W.L.	16 ft. 8	in.
Beam	6 ft. 6	in.
Hull Draft	7½	in.
Racing Weight	1,700	lbs.

The object of these specifications is to supplement the drawings. Any item mentioned here and not shown in the drawings, or vice versa, is to be considered as if shown in both drawings and specifications. The fact that any item essential to the seaworthiness or safety of this boat is not shown or described in either drawings or specifications shall not be considered as an excuse for the elimination of such items from the completed boat.

All lumber shall be of good quality and free from knots, shakes, checks, or warps, except that tight knots of not over ½ in. dia. will be permitted. Marine glue of approved quality shall be spread on every faying surface adjacent to the water. All fastenings and other hardware must be of hot-dipped galvanized iron or of brass, bronze, Everdur, or other nonferrous metal. Throughout the construction, only articles of approved marine type should be used—employ no house paint, black-iron fastenings, roof cement, or similar nonmarine items.

The lines of the boat should be laid down full size on the shop floor from the accompanying Table of Offsets. The Table was prepared as carefully as possible, but very slight variations may be necessary for fairing purposes.

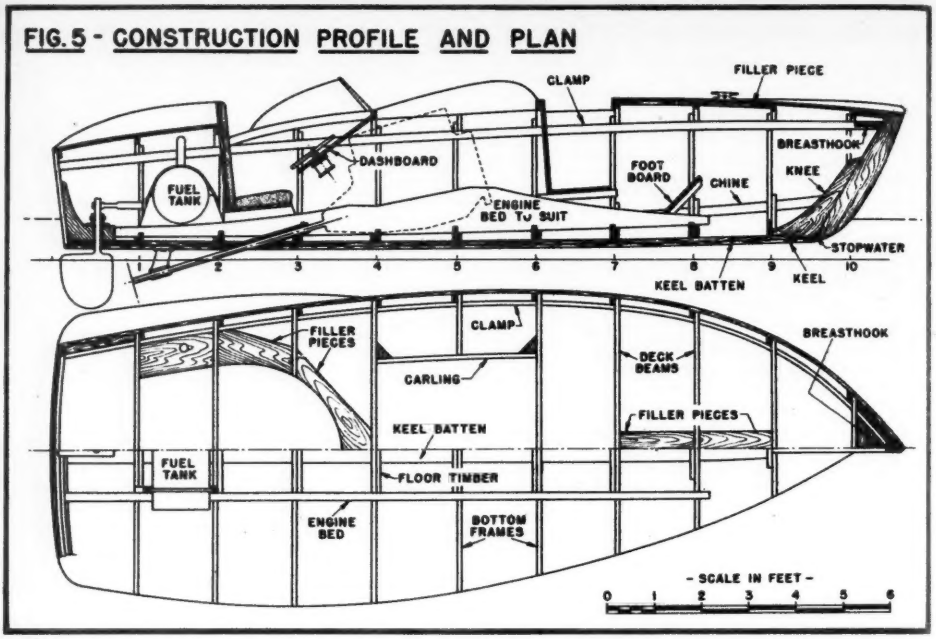
Where more than one material is specified, they are listed in order of preference. Wherever a part is actually dimensioned on the drawing, or specified by size, such dimensions are to be used in preference to those obtained by scaling.

Keel. Longleaf pine or spruce in two pieces. The main keel is 1⅛ in. thick by 6 in. wide, tapering down as required to meet the stem properly. The second portion of the keel is ⅝ in. thick and 4 in. wide, also tapered to suit requirements at the stem. The two pieces are smeared with marine glue and fastened together with

to plank her entirely with plywood. Even the use of that material as the inner layer of bottom planking is not too highly recommended. Orthodox materials, as specified, are lighter than plywood.

So stick to the plans and specifications; install a lightweight, high-speed engine; use extreme care when building her to see that all joints and fastenings are tight; and handle her with care after she is in service. She is not a general-service boat that can be knocked around, banged against the dock, and hauled out and forgotten during the winter. Give her the care she deserves and she should repay you in full measure with her flashing speed and handsome, modern appearance.

One thing any amateur who isn't too sure of himself should do before starting to build is to study a good book on the subject. There are several such books. Perhaps the best known is MI-Contributor Wm. F. Crosby's *Amateur Boatbuilding* (The Rudder Publishing Company).



1½-in. No. 10 screws spaced about 6 in. apart.

Stem. Composed of the main stem and the stem knee. Both are shaped approximately as shown in the plans. To be preferably of white oak, sided 2½ in., although hackmatack knees, which will be lighter, can be substituted. The two parts are fastened together with ¼-in. bolts with the heads countersunk and plugged on the outside. There are two bolts through the keel and stem knee and three bolts through the stem and stem knee. In way of the extreme point of the stem, the sides of the boltheads should be ground off and fairly deeply countersunk to set them in beyond the shaping of the stem. After planking, the stem is faired off to a width of ⅜ in. and a light brass stem band screwed in place.

Stern Knee. Molded as shown, of longleaf pine or spruce, and sided 3 in. To be secured with ¼-in. bolts through the keel and through the transom. The stern knee will later be bored to take the 1-in. rudder port.

Transom. White oak or mahogany, ⅞ in. thick, or ¾-in. waterproof plywood, preferably mahogany faced. Along the forward, outer edges of the transom there are ⅞x1½-in. oak cleats, well screw-fastened to form an extra backing for the side and bottom planks. If preferred, these cleats may be set in marine glue and placed the thickness of the planking in from the edge of the transom. This will form a rabbet covering the ends of the plank. Care should be taken if this is done to make the transom to the outside of the planking rather than to the inside. The transom is bent to a radius of 18 ft. This can best be done by setting up a form on the shop floor and bending the transom boards before installation in the boat. If the system of setting the cleats in from the edge is followed, they should be 1¼ in. thick instead of ⅞ in. In either case, the ends of the planking and the edges of the transom should be covered with brass or bronze to prevent the transom from chipping off should it rub against a dock.

Stopwater. There is a white-pine stopwater ½ in. in diameter located in the stem as shown in the plans. This stopwater is set in marine glue.

Breasthook. Longleaf pine or spruce, about 1¼ in. thick, located as shown between the ends of the clamps at the stem and strongly fastened from outside with lag screws after filler pieces have been fitted between the planking and the clamps.

Frames. Longleaf pine or spruce, located as shown in the plans. Sided not less than ¾ in. The molded dimension of the bottom frames is 2¼ in. and of the side frames is 3 in. at the chine, tapered to 2

in. at the sheer. They are assembled and secured to the floor timbers and deck beams with ¼-in. bolts or heavy screws that pass virtually all the way through the parts. The use of a waterproof adhesive glue at these junctions is suggested. This is a hard-setting glue and is not the same as the marine glue specified for seams.

Floor Timbers. Longleaf pine or spruce, sided ¾ in., molded 5 in. above top of keel, and fastened to the keel with ¼-in. bolts. The floor timbers for frames 1 to 4 go on the forward sides of the frames and the floor timbers forward of that go on the after sides. If it becomes necessary to reduce the height of any of these in order to install the engine as low as possible, it should be doubled.

Limbers. In the heel of each frame and floor timber, alongside the keel, there are two triangular limber holes cut to allow bilge water to drain to the lowest point of the boat.

Chines. Each chine is composed of two pieces, the inner one being about ⅞x2½ in., of oak or longleaf pine, and the outer one being 1½ in. square, of pine or spruce. As there is much [*Continued on page* 145]

BILL OF MATERIALS

White Oak

(Specify that wood is to be used for boatbuilding; is to consist of first, second, and select grades only; and is to be air-dried to a maximum of 15% moisture content.)

Inner Chines: 2 pcs. 24 ft. long, S4S ⅞" x 2½"
Transom Cleating (see specifications): either 20 lineal ft., S4S ⅞" x 1½", or 20 lineal ft., S4S 1¼" x 1½"
Bilge Guards: 2 pcs. 7 ft. long, S4S 1½" x 1½"
Stem: 1 pc. 8" x 48", S2S 2½"
Stem Knee: 1 pc. 12" x 36", S2S 2½"

Spruce

(Specify that wood is to be used for boatbuilding, is to consist of A and B grades only, and is to be air-dried to a maximum of 15% moisture content.)

Seam Battens: 240 lineal ft., S4S ½" x 1¼"
Keel: 1 pc. 17 ft. long, S4S ⅜" x 4"
Frames, Floor Timbers, and Deck Beams: 125 board ft., S2S ¾" (random widths and lengths)
Clamps: 2 pcs. 24 ft. long, S4S ¾" x 1¾"
Carlings and Hatch Sills: 14 lineal ft., S4S ⅞" x 1½"
Keelson: 1 pc. 17 ft. long, S4S 1⅛" x 6"
Fillers: 25 board ft., S2S 1⅛" (choose wide pieces)
Breasthook: 1 pc. 12" x 24", S2S 1¼"
Outer Chines: 2 pcs. 24 ft. long, S4S 1½" x 1½"
Tank Chocks: 2 pcs. 12" x 24", S2S 1½"
Engine Beds: 2 pcs. 12" x 13 ft., S2S 2"
Stem Ornament: 1 pc. 3" x 48", S2S 3"
Stern Knee: 1 pc. 14" x 24", S2S 3"
After-Deck Molding: 8 lineal ft., 1" quarter-round

White Cedar or White Pine

(Specify that wood is to be used for boatbuilding, is to consist of A and B grades only, and is to be air-dried to a maximum of 15% moisture content.)

Bottom Planking: 300 sq. ft., S2S ¼" (See Note No. 1)
Side Planking: 120 sq. ft., S2S ⅜" (See Note No. 1)

White Pine

(Specify as described above.)

Stopwater: 1 pc. ½" dia. x 2½"

Mahogany

(Specify that wood is to be used for boatbuilding; is to consist of first, second, and select grades only, and is to be air-dried to a maximum of 15% moisture content.)

Bottom Planking: 300 sq. ft., S2S ¼" (See Note No. 1)
Side Planking: 120 sq. ft., S2S ⅜" (See Note No. 1)
Transom: 20 sq. ft., S2S ⅞" (See Note No. 2)
Main-Sheer Molding: 2 pcs. 24 ft. long, 1" half-round

Mahogany-Faced Marine-Grade Plywood

Transom: 1 pc. ¾" x 30" x 72" (See Note No. 2)

Marine-Grade Plywood

Decking and After-Cockpit Sheathing: 3 sheets ¼" x 4'-0" x 12'-0"
Forward-Cockpit Seat and Hatch Sides: 1 sheet ⅜" x 4'-0" x 8'-0"
Flooring and Foot Boards: 1 sheet ½" x 4'-0" x 8'-0"
After-Cockpit Seat: 1 pc. ¾" x 10 sq. ft.

Aluminum

Hatch Cover, After-Deck Erection, and Gussets: 48 sq. ft., 24-ga. sheet
Stiffeners: 32 lineal ft., 1" x 1" angle bar

Fastenings

1 lb. copper ⅝" tacks
200 aluminum ⅛" x ¼" roundhead rivets
1 pkg. split-type ½" brake-lining rivets
4 doz. brass 8-32 roundhead machine screws, ¾" long
1 gross brass or Everdur ½" No. 4 flathead screws
14 gross brass or Everdur ½" No. 6 flathead screws
10 gross brass or Everdur ⅝" No. 6 flathead screws
1 gross brass or Everdur ½" No. 5 flathead screws
6 gross brass or Everdur 1¼" No. 8 flathead screws
1 gross brass or Everdur 1¼" No. 10 flathead screws
4 gross brass or Everdur 1½" No. 10 flathead screws
1 gross brass or Everdur 1¾" No. 12 flathead screws
1 gross brass or Everdur 2" No. 10 flathead screws
6 bronze ⅜" x 6" lag screws
200 bronze ¼" x 2" carriage bolts
2 doz. bronze ¼" x 3" carriage bolts
2 doz. bronze ¼" x 4" carriage bolts
4 doz. galvanized-iron ¼" x 8" carriage bolts
300 brass ¼" hexagon nuts
4 doz. galvanized-steel ¼" hexagon nuts

Hardware

Complete kits of hardware can be purchased from John Dory, Box 96, Fair Haven, New Jersey.

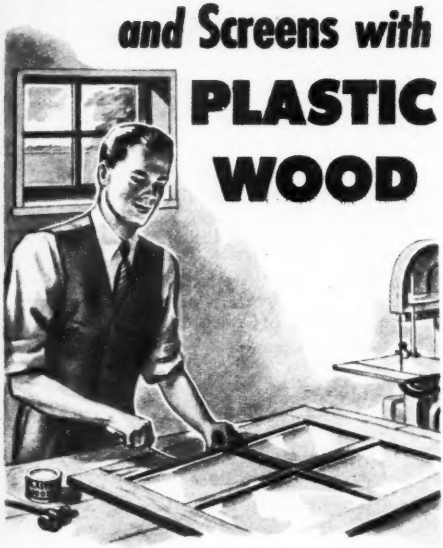
Miscellaneous

6 ft. brake lining, 3/16" x 1½"
6 ft. brass 3/16" x 1½" flatbar
14 ft. brass 20-ga. sheet, 3" wide
6 ft. brass ⅜" half-round
12 ft. aluminum ¾" tubing
100 sq. ft. 6-oz. canvas
1 lb. plastic resin glue
1 gal. liquid marine glue
4 gal. marine paint or varnish to suit
Cockpit fittings to suit
Engine installation to suit

Notes

1. Use mahogany or white cedar or white pine—not all three.
2. Use either mahogany or mahogany-faced plywood—not both.

Repair Storm Windows and Screens with PLASTIC WOOD



When making new screens, or replacing old rusted screen, apply thin layer of PLASTIC WOOD around frame after tacking down screen. This gives greater strength to the frame. PLASTIC WOOD can be easily shaped to match broken molding. Valuable in replacing rotted wood in storm windows.

. . . dozens of other uses

FOR FILLING . . .	FOR REPAIRING . . .
• Cracks in floors	• Loose tiles
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• Chipped furniture	• Broken balusters
• Nail and screw holes	• Broken furniture

• PLASTIC WOOD SOLVENT is indispensable to the home workshop hobbyist for controlling the consistency of Plastic Wood and removing dried Plastic Wood from hands and tools.

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PLASTIC WOOD®

Tube or Can

A CELLULOSE FIBRE FILLER

Control-Line Waco Y-3

[*Continued from page* 112]

covering, since it will stand up under constant use a little better than paper covering. However, paper will do. Use a double layer around the nose and landing gear where the model will be handled most and will be subjected to occasional rips and tears. After doping the covering start final assembly.

Of all the methods used in assembling a biplane, the following works well: Using blocks of scrap balsa, prop up the fuselage in a level attitude. (Check with fuselage side view for proper position). Now use additional blocks to support both lower wing panels in position along the fuselage sides. Before using any cement, check for proper incidence (0° here) in *both* panels and see that the wing is square to fuselage when viewed from above. When satisfied, cement in place. The upper wing can be propped up before cementing in the struts; or the center section (cabane) struts can be added first, the upper wing checked, and outer struts added. In either case carefully check alignment as you go along, as the flying qualities of the completed model depend directly upon proper alignment of the wings.

The control wire leads from the bellcrank can pass through holes centered in the front struts of the outer "N" struts. Simple guides of small screw eyes or wire loops may be used if you prefer. Bind and cement securely to the struts.

You've undoubtedly been inspired by the color scheme of the Waco at the local airport, or you may prefer to finish your model like the original. The color scheme was all-red with cream trim. The trim being the arrow-stripes along the sides of the fuselage and wheel pants, plus the vee on top of the upper wing.

Either thin bamboo slivers or No. 8 sewing thread can be used to simulate the wire rigging on the real ship. Don't leave this off, as it helps appearance immensely and adds to the strength of the model.

The engine cowling may be carved or turned from block balsa. Spun aluminum is preferred and the proper size may be obtainable at most hobby stores.

The cowl is held in place with three "L" shaped metal angles which are bolted to the firewall and to the cowling. The outlining of the controls with a draftsman's ruling pen is optional, as is the use of *both* elevators for stunt, or only one for sport flying.

Test flying should be done on about 35 ft. lines with full throttle, not partial power. After "check-out," line length can be increased up to 60 ft. or even more. •

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AND

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THAT CUSHIONY FEELING LASTS LONGER WITH MARFAK!

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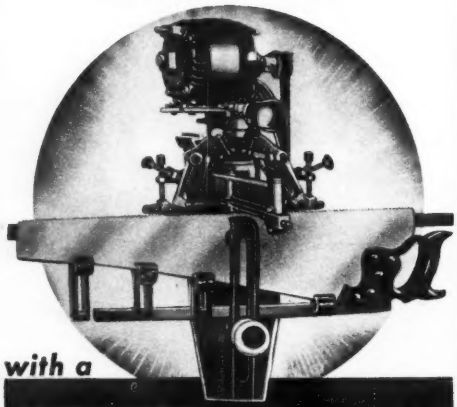

with a

FOLEY *automatic* SAW FILER

"Last year's profit amounted to $3,000. Not so bad for a one-man outfit"—from Chas. C. Hough, Penn. From Ohio, James B. Williams wrote us—"I made $765 last year filing saws, and it sure comes in handy. I do this work in my spare time". Men in communities of all sizes make up to $2 or $3 an hour with the Foley Saw Filer working full time or part time. That extra money comes in mighty handy in these days of rising prices.

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Minneapolis 18, Minn.
Send me free book "INDEPENDENCE AFTER 40".

Name.....

Address.....

Learning the Code

[*Continued from page* 99]

items are mounted on any scrap piece of board and wired in series, as shown in the accompanying drawing. Pressing the key (which is nothing but a spring operated switch) causes the buzzer to buzz. Adjust the spacing of the contacts to about 3/64 inch and the tension of the spring so that the lever goes down easily when the knob is depressed.

This code practice set lends itself to either individual or group instruction. Many people have taught themselves the code, but faster progress will be made with two or more learners practicing at the same time. The idea is for one person to transmit for ten or fifteen minutes while the others listen and copy; then they switch positions.

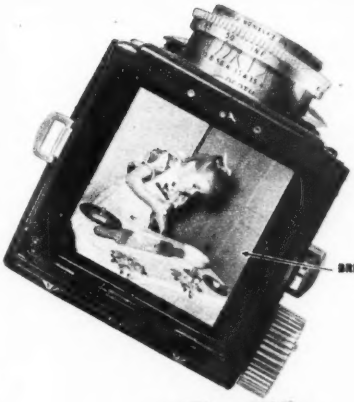
The basic characters of the Continental Code are a short buzz, best referred to as a "dit," and a definitely longer buzz, called a "dah." Technically, a dah is supposed to be three times as long as a dit; the spacing between dits and dahs of the same letter is equivalent to the duration of a dit; the spacing between letters is three dits; and between whole words the time is roughly five dits. The only convenient way of showing the code in print is by dots and dashes; a dot for a dit and a dash for a dah. The chart that appears herewith shows the combinations forming the twenty-six letters of the alphabet, the ten numbers and eight of the most commonly used punctuation marks.

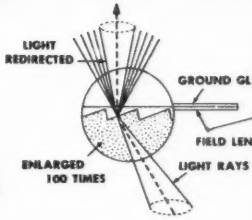
How do you get started? The wrong way, definitely, is to try to memorize the whole alphabet, starting with A. The easier way is to break the code into the groups as shown in the chart, and to commence with the simplest and shortest character, the letter E. This consists merely of one dit. Instead of saying to yourself, "E, one dit," don't say anything, but press the key quickly and let the short buzz register in your ear and therefore on your brain as E. The position of the hand for sending is a natural one. Rest your whole arm on the table, put the first and second fingers on the top of the key knob and the thumb against the edge, and relax. Don't punch the knob; just push it down.

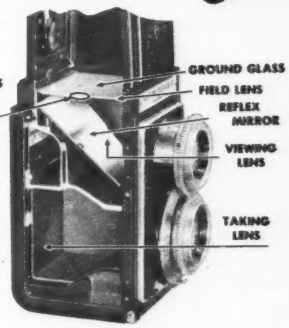
Now try two dits for I, three for S, four for H and five for the numeral 5. They're a cinch, of course, and you should know them thoroughly in ten minutes. If you have a partner, give him the key, let him send, and you check him for uniformity of dit length and spacing. At the end of the first half hour you are entirely ready to send and copy complete words. Try simple combinations such as *is, his, she, see,* etc. If you have time during this ini-

[*Continued on page* 136]

See the image 2½ times as Bright







(Prices subject to change without notice)

SPARKLING BRIGHT describes the image you see in the finder of the new Kodak Reflex II Camera. Sharper focusing, edge-to-edge composing are made possible with the new Kodak Ektalite Field Lens beneath the ground-glass screen (see diagram above). Microscopic lens grooves redirect stray light rays—give you an image *2½ times as bright overall, 10 times as bright at corners,* as with the usual ground-glass finder.

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FIRST IN OUTBOARDS • 40th YEAR

Learning the Code

[*Continued from page* 134]

tial session, continue with the dah letters, of which there are four. Don't worry about the exact length of the dah in relation to the dit; as long as one noise is clearly longer than the other, one is dah and the other is dit. Lots of words can now be built up. Try *miss, teem, meet, met, set, most, shot, those, these, them,* etc. Repeat them several times so that the swing of the dits and dahs has a chance to sink in. This is really enough as a starter.

The next evening, review the work of the previous lesson and then proceed to the third and fourth groups. These letters start with either one dit or one dah and build up with one to four dahs and dits, respectively. Remember, you learn them by making their sounds on the buzzer, not by "talking" them out. First get the individual letters fixed firmly in your mind, and then make up more practice words or even sentences: *Tom is not at home. He is at 10 West 16st St. Was Ned with him? Bessie has a hoss named Bettsie.* It is much, much better to do this than to send and write down random letters. Any text that makes sense when the receiving operator writes it on paper will greatly encourage him and build up his confidence.

If you are still feeling fresh and are quite sure that you hear no buzzing noises in your head with the key up, you might tackle the fourth group, which contains only three characters. Try a few more words and then call it quits for the night: *Nuts. Dumb. Business is not so hot,* etc.

Always start each new session by reviewing all the letters already committed to memory. You are now ready to absorb the remaining letters and numbers. These will require more practice than the others, because the combinations are longer, but again practice does it. With an overall review the fourth evening, you should know the entire code, and what's more, you should be able to translate the dits and dahs into something you can read.

Under "Punctuation Marks" in the chart are several that need explanation. Suppose you want to send the word *paper*. You make the P correctly, but as you finish the letter A you inadvertently press the key again and it comes out R. You realize that you have done this. Immediately send a string of eight dits, for the "Error" signal, wait a moment, and then start the word from the beginning. The "End of Message," "Wait," "Go Ahead" and "End of Communication" marks are not written down at all; they are intended as instructions. "Go Ahead" is the letter K, actually.

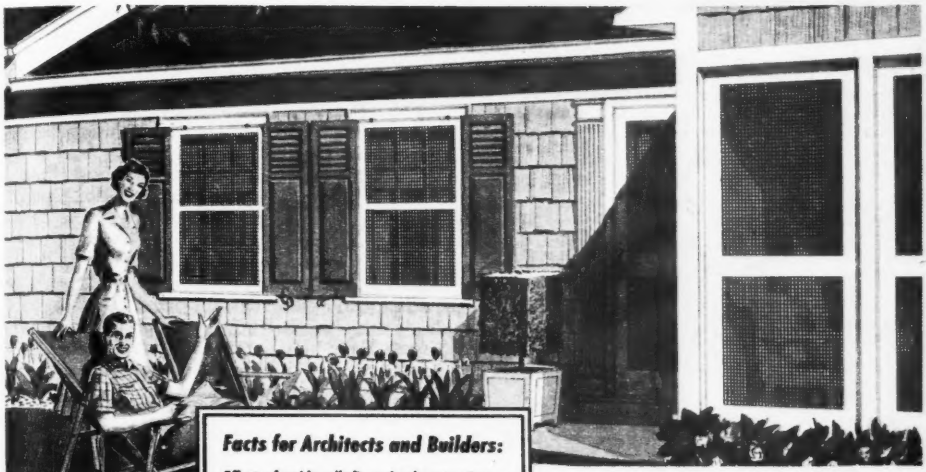
From now on practice, practice, practice.

[*Continued on page* 140]

Amazing new LUMITE *screening*

STAINPROOF

Because it's Rustproof!



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CAN'T STAIN YOUR HOUSE!

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Facts for Architects and Builders:

Effect of acids, alkalis and solvents—Essentially none.

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Non-inflammable—Will not support flame . . . is self-extinguishing. Melting point, 340°F.

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Imagine a plastic so strong that it actually has greater impact strength than any other type of screening. That's LUMITE!

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Imagine a screening that is so easy to handle anyone can frame it—no special tools needed—will never sag or bulge when properly framed. That's LUMITE!

For your new home or to replace old screens, order LUMITE from your hardware, lumber or building supply dealer.

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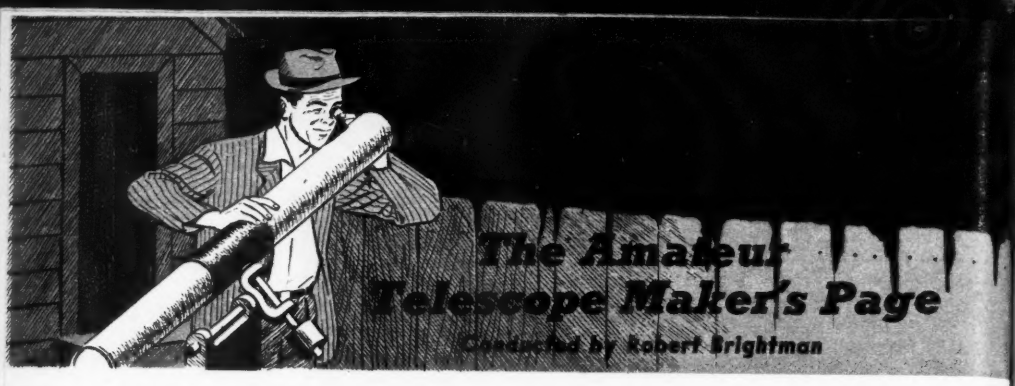


The Amateur Telescope Maker's Page

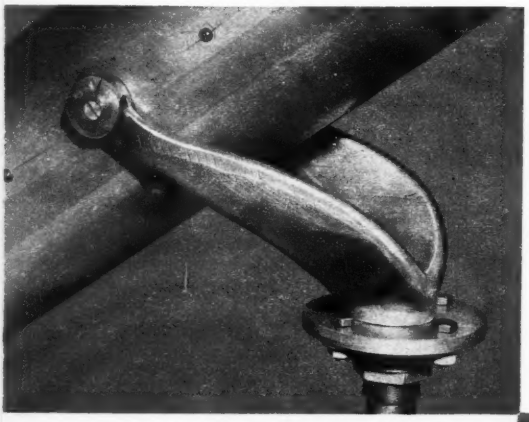
Conducted by Robert Brightman

George Schirm and a reflecting telescope made with the Gallagher fork described in the text. This type of fork permits maximum elevation.

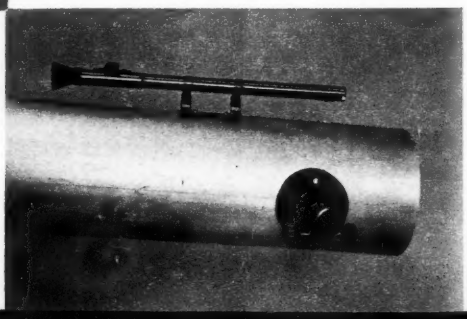
TELESCOPE makers evidently take their hobbies quite seriously, as witness the work of Neil A. Gallagher of Rochester, N. Y. Not content with the yoke described in the plans for MI's Portable Six-Inch Telescope, he went a bit further and designed the unique offset fork shown in the photographs on this page. A local foundry cast the fork for him in aluminum.

The Gallagher fork is unusual, inasmuch as it permits a full 90° elevation of the telescope from the horizontal. A few of the interesting wrinkles incorporated in this instrument are worth describing. The tension on the bearing surfaces of the two trunnions is achieved by tightening two Allen cap screws. Each bearing surface was first split by means of a hack saw cut. Then, the lower half of the bearing cap was tapped for a ¼x20 thread. The upper half was holed through with a ¼ in. drill and then counterbored to accept the head of a ¼x20 Allen cap screw. As the Allen screw is tightened by means of the key inserted into its head, the bearing is brought together, thus achieving the desired tension. The entire instrument is nicely balanced so that it will stay put in any position.

Another interesting wrinkle is the application of a Mossberg rifle 'scope as a finder. Why rifle sight manufacturers have not explored this field for their product is a deep mystery to us. A rifle sight is ideal as a finder for a telescope. First of all, its mount is adjustable so that any errors in mounting can be easily corrected with-



Upper part of fork is split. Tension on bearing surfaces is made by taking up on Allen cap screws inserted into counterbored holes.



A 4x rifle sighting 'scope makes an ideal finder for a telescope. The cross hairs can be quickly adjusted vertically or horizontally.

out the necessity of boring additional holes. Secondly, the reticule, or cross hairs, can be quickly adjusted horizontally and vertically so that their intersection can be brought to the exact point at which the main telescope is focused.

The bottom part of the fork is bolted to a plate which, in turn, is bolted to a 3-in. pipe flange. This flange is screwed into a 3-in. pipe plug, thus making the bearing surface on which the telescope is swung horizontally.

The eyepiece adapter is a rack-and-pinion type made by the Precision Optical Co. of New York City. Note that this adapter is placed at the side of the telescope with the finder at the top. This design is recommended for astronomical work. This type of mounting permits you to view the image comfortably from the side of the tube without the necessity of having to crane your neck or use a stool which is the case when the adapter is mounted on top of the telescope.

In our February issue we inadvertently called a "flat" a mirror with the silvering on the back. Obviously, this is an error. All optical flats are silvered on the front. Incidentally, the so-called "silvering" nowadays consists of an aluminum coat. •

More than 3,700 readers of MECHANIX ILLUSTRATED have started to build this Portable Six-Inch Reflecting Telescope. With it you can see the polar caps of Mars and the moons of Jupiter. It can be built for less than $30.00. A complete set of plans, including drawings, photographs and instructions, is now available. Send $2.00 to MI Plans Service, Fawcett Building, Greenwich, Conn. Please ask for plan No. P-6. For a free optical suppliers' list please send a self-addressed, stamped envelope to the Astronomy Editor, 67 W. 44th St., New York 18, N. Y.

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See also classified section page 55

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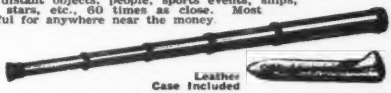
NEW! 3 different magnifications by simple adjustment of the eyepiece. 15 power for ultra-bright images with 30 and 60 power for extra long range. Guaranteed to bring distant objects, people, sports events, ships, moon, stars, etc., 60 times as close. Most powerful for anywhere near the money



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☐ Welding School Booklet

☐ Vest Pocket Guide

☐ Send me complete Arc Welder Catalog

Name_____

Address_____

Learning the Code

[*Continued from page* 136]

Small, regular doses are more effective than big, irregular ones. Don't even bother to time yourself the first week. Speed comes naturally with practice. The license requirement, 13 words per minute, is really pretty easy, you'll discover.

If a partner isn't available every time you are prepared to practice, send to yourself, to develop your "fist." You must be especially careful of spacing, since any irregularity produces false characters. For instance, if you pause in the making of 6, the receiving operator is quite likely to write down TH. Likewise, if you run T and H of the common word *the* too close together, the other lad may record the number 6.

All during this learning period there is nothing to prevent you from listening on a short-wave receiver and trying to distinguish characters transmitted by amateur and commercial stations. There are literally thousands of these stations, going at all hours of the day and night, but not all of them are good for code practice because they run along at a fast clip. On the amateur bands, 3.5 to 4 megacycles, 7 to 7.3, and 14 to 14.4, you can hear some of the worst as well as some of the best keying on the air. Don't be surprised if what you copy doesn't make sense. Many hams who are not qualified to handle them insist on using semi-automatic keys, which usually produce several extra dits for every character contains dits. This is likely to be somewhat unnerving to a beginner. Just keep tuning around, copy what you can, and don't worry about what you miss.

Provide yourself with plenty of ruled paper and soft pencils, and continue your steady practice by writing down the letters as you hear them. Give yourself a margin of safety by working up to a clean, solid 15 words per minute before you attempt the Federal Communications Commission examination. And if you flunk the first time, because of nervousness, strange surroundings or sheer buck fever, you can try again in a month. The test doesn't cost a cent, and neither does the license itself. Uncle Sam encourages ham radio, and you'll find his FCC representatives anxious to help you. Almost without exception they are hams themselves.

After a month or so you'll discover that you can "read" transmissions in your head without actually writing down the letters or words. This is a sign of real progress. Experienced operators can gab with each other for hours without touching a pencil or paper. Many of them can carry on verbal conversations with

[*Continued on page* 142]

DELTA® 8" Tilting-Arbor Saw

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Have your nearby Delta distributor show you this new Delta 8" Tilting-Arbor Saw. And have him tell you how you can get it on easy credit terms. See him now.

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Free Bulletin AD-455! Pictures and describes the new Delta 8" Tilting-Arbor Saw, feature by feature. Shows why Delta quality construction means longer saw life and greater operating satisfaction.

Also available without charge is Delta Catalog B-48—a handbook of woodworking machines.

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TEAR OUT COUPON AND MAIL TODAY!

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Please *rush* me all the details!

FLOK KRAFT TRADE MARK REG.

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STREET _____
CITY _____ STATE _____

Learning the Code

[*Continued from page* 140]

persons right next to them, at the same time taking in an unbroken series of dits and dahs as they issue from a loud speaker. In experiments conducted several years ago by the Navy, messages were transmitted to certain operators in their bunks, whlie they were asleep. In the morning some of the men were able to transcribe the messages, apparently out of their subconscious minds!

Often it is desirable to copy press reports, weather transmissions, etc., for reference purposes. Really the best means is a typewriter, even if you use the "hunt and peck" system. Code speeds of 20 to 25 words per minute are considered excellent, and represent an average for commercial message handling. This speed on a typewriter is just lazy tapping.

Even if you don't want to take out a ham license, knowing the code makes a short-wave receiver many times more interesting. There's *always* something doing, and you run into the most unexpected stations. •

MI Picture Projector

[*Continued from page* 120]

of flat iron bent into the shape of a square U having a control arm, a piece of screendoor spring and a square of felt to cover the holder. As indicated in the drawings, the bracket is mounted inside the base of the projector with bolts.

The novel illumination system, photo No. 7, utilizes from two to eight porcelain sockets mounted inside a cage which surrounds the copy window.

The cage can also be constructed of perforated sheet metal. Free ventilation is necessary. The G. E. 40-watt showcase lamps, reflector type, are screwed into the sockets so that the light is directed onto the copy only. Construction of the lamp bases makes this adjustment possible. Even illumination is possible with only two lamps, because of the efficient reflectors which are a part of the lamps. At least four lamps are suggested for more powerful illumination. Bend over the edges of a sheet of metal to make a cover for the lamp unit, leaving a 4 in. square opening in the center. Coat it with flat black paint. The wire (use 16 gauge) is brought through a grommet in the rear of the housing. It is connected in series with a toggle switch and in parallel with the lamps. After an outside paint job, photo No. 5, the projector is ready to show! •

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The "Pocket-Size Machine Shop"

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No modern home workshop is completely equipped without MOTO-TOOL . . . the correctly balanced motor-in-hand tool. It grinds, drills, routs, carves, polishes . . . without vibration. Higher speed does work better, faster, on practically any material. MOTO-TOOL Kit No. 2 includes high-speed-steel cutters for longer life, better work. MOTO-TOOL is backed by over 12 years of industrial use . . . packs years of pleasure. Due to wide popularity and increased production, Dremel's pre-war prices still prevail!

MOTO-TOOL No. 2 With Emery Point **$16.50**

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NEW DRILL PRESS
This 12" high precision drill press is ideal for model making, wood carving, routing, etc. Utilizes No. 2 Moto-Tool. Only $9.95 (Less Moto-Tool)

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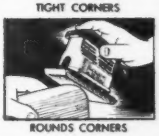

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Combination Sander

[*Continued from page* 102]

to feed from the other side, get a firm grip on the work with both hands and hold it very lightly against the wheel. The disk will cut faster than the belt, so caution must be exercised to avoid overcutting. Remember that the outer edge of the disk is traveling much faster than the inside and can cut ridges in work carelessly held. A little practice with scrap wood will give you the correct "feel."

The abrasive disks can be purchased like the belts, or you can cut your own from standard sheets of garnet or aluminum-oxide paper. One sheet will make a disk if cut and applied in two pieces, as shown. The abrasive is secured to the metal disk with heavy rubber cement. When an abrasive disk is worn out, it must be removed before applying a new one—don't try pasting them one over the other. A stunt that will increase the capacity of the disk is to cement a narrow strip of abrasive paper around the edge. With this, notches, tenons, open mortises, lap joints, etc., can be sanded smooth and to a close fit.

The power sander is a rugged tool that will give years of efficient service if properly operated. There is a common safety rule applicable to *all* rotating power tools—*don't* wear a necktie or long sleeves when working or you may literally be wrapped up in your work. *Don't* use the table or bench in the vicinity of your sander for assembling parts, hammering, etc. A slip with a hammer may crack the housing or other cast-iron parts of the sander. *Don't* try to sand very thin pieces on the belt. They may slip between fence and belt, seriously jamming the sander. *Don't* work an abrasive belt or disk until it is worn smooth. It wastes time, puts an added burden on the moving parts of the sander, and is likely to burn the work. Scrubbing the abrasive with a stiff wire brush occasionally will prolong its active life by removing gum and wood particles that stick to it.

Oil all parts frequently and keep a film of oil on the ground surface of the disk table when the sander is not in use. Keep at least two extra belts on hand at all times. They don't break or tear easily, but it's nice to have extras just in case. Always use the disk-table adjustment and angle gauge when precision angle sanding is required. Your eye may be fairly good, but the gauge is perfect. Sand all parts separately and completely before assembly, even when the project is small. Use the sander only for its intended purposes. It may sound foolish to say that anyone would mount a carborundum wheel or circular-saw blade on the disk arbor, but there have actually been such cases. •

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A Racing Runabout

[*Continued from page* 131]

shaping of these pieces, they should be put in slightly oversize and beveled off to suit. The inner chine is fastened into each frame notch with a 2-in. No. 10 screw. The two chines fasten together with 1½-in. No. 10 screws spaced about 5 in. apart with the heads well countersunk into the outer chine. At the ends, the chines box into the stem and the transom cleat. It is highly essential that the outside chine corner be left as sharp as possible, as rounding it over will only result in a loss of boat speed.

Deck Beams. Spruce or white pine, sided ¾ in., molded 1½ in., and located as shown on the Construction Profile and Plan. All deck beams are sawn to a radius of 13 ft. 1½ in. This whole construction is very light; so care should be taken not to walk on the deck if you can possibly avoid it.

Clamps. White pine or spruce, sided ¾ in. and molded 1¾ in. They run along the insides of the frames from stem to transom and each is secured at each framehead with two 1¾-in. No. 12 screws. It is important that these clamps be fastened the proper distance below the sheer line so the deck beams will firmly rest upon them and the top of the decking come exactly to the sheer line.

Fillers. Beneath all deck fittings and in way of the driver's cockpit there should be fillers of spruce about 1⅛ in. thick. Two small triangular fillers should also be fitted between the deck beams and carling at station 4 and two more at station 6. The filler shown between stations 1 and 2 need only be installed on the port side in way of the tank fill pipe. All fillers should be well fastened and cut to the same crown as the decking.

Seam Battens. Spruce or white pine, ½x1¼ in., notched into the side frames and so spaced that there will be five side planks on each side of the boat, remembering that the planks are so tapered that all are of the same width at any particular frame. There is also an extra seam batten at the head of each frame. At the ends, the battens box into the stem and transom cleats. Fasten with 1¼-in. No. 10 screws.

Planking. White cedar, Philippine mahogany, or white pine, preferably in single lengths from stem to stern. The bottom planking

[*Continued on page* 146]

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ROGERS MFG. CO., Dept. L-49, Lindsey, Ohio

A Racing Runabout

[*Continued from page* 145]

consists of two layers of ¼-in. material. These should be laid out so the seams are staggered. The inner layer can be lightly fastened to the frames in any convenient way, as the main fastenings pass through both outer and inner layers into the frames. The two layers should be put on alternately rather than completing one layer and then the next. Do not put canvas or other fabric between the layers but be certain to apply marine glue (of the non-hardening type), white lead, or thick paint so liberally that it squeezes out all around. The main fastenings are 1¼-in. No. 8 screws with the heads flush with the outer layer and the screw slots turned fore and aft. In no place should these screws be over 2 in. apart. Along each seam in both the inner and outer layers there are additional ½-in. No. 6 screws spaced no more than 3 in. apart or copper nails riveted over burrs. The ⅜-in. side planking is fastened to the frames in the same manner as the bottom planking. In the seam battens, ⅝-in. screws are used. No calking is necessary if plenty of marine glue is employed.

Decking. Marine plywood, ¼ in. thick, covered with 6-oz. canvas laid in marine glue. The deck screws to the deck beams and to the sheer battens, the fastenings being ½-in. No. 6 screws. Any necessary seams in the decking should be backed with battens similar to those used for the side planks.

Engine Bed. The exact shape of the bed can only be determined after a template is made of the particular engine to be installed. It is important that the shaft line be kept as flat as possible, which means that the engine must be set very low in the boat. To obtain the shaft line, the propeller diameter should be known. It is recommended that you write in, telling us the engine you are going to use, for a recommendation in regard to propeller size. The weight of the engine must be concentrated where shown in the plans. The beds are spruce, not less than 2 in. thick and not shorter than is shown in the plans. They notch over frames and floor timbers all the way up to and including frame 8 and should be thoroughly secured with ¼-in. bolts. Where possible, extra bracing should be installed. In way of frames 4 and 5, aluminum tubing, as shown on the Midship Section, is fitted. It should be ¾ in. in diameter, flattened at the ends, and bolted as shown. An alternative is to brace the beds at these two frames with spruce knees bolted to the sides of the frames.

Windshield. To be substantially as shown, although a wide variety in the exact style can

be made. It should be of either nonshatterable glass or plastic.

Flooring. To save weight, there should be flooring at only vitally necessary points. Strips of ½x3-in. waterproof plywood can be screw-fastened wherever necessary. Slanting foot boards are also installed, arranging them to suit the owner's particular requirements.

Cockpits. To save weight, the forward cockpit can have the cushions arranged to be removable and the seats made of ⅜-in. plywood strips. A canvas cover should be arranged to button down tightly around the cockpit opening. The after-cockpit seats are of ¾-in. plywood, well braced and supported at the center and fitted with thick cushions. The sides of this cockpit are ceiled with ¼-in. plywood. The back is a ¼-in. sheet of waterproof plywood to which thin upholstery is tacked, reaching to the top of the streamlined superstructure and shaped to fit it. This back should be removable to give access to the tank and steering gear.

Engine Hatch. The exact size of the engine hatch depends to a large extent upon the power plant installed. It is mounted on a rabbetted sill, ⅞x1½ in., bolted through the carling. This sill is fitted to the crown of the deck on the underside, but is straight across on the top. The rabbet should run off to nothing at the after end of the hatch. The hatch sides are ⅜-in. plywood. The cover is 24-ga. aluminum, bent to about the shape shown and pierced with three air openings about 1x3 in. to act as vents. There should be at least four 1x1-in. aluminum angles across the underside of the hatch top, attached to the sides with gussets of the same material. The gussets are flanged over at top and sides, riveted to the angles, and secured to the plywood sides with machine screws. The hinge at the forward end is of the continuous type. The hatch is held down at the after end with spring catches. A rod should be arranged inside to hold the hatch up when repairs are to be made to the engine.

After-Deck Erection. To carry out the streamlined effect, an aluminum housing is built over the after deck. It is made of 24-ga. aluminum, supported by 1-in. aluminum angles and gussets, and held down to the deck by a quarter-round molding beneath which the aluminum is bent. The drawings show approximate dimensions, but these may have to be varied slightly, as the final housing will have to be fitted to the boat. It should be noted that while this erection improves the appearance of the boat, it also adds a small amount of weight, so is more apt to slightly reduce the speed rather than increase it. If the erection is not used, the back of the

[*Continued on page* 148]

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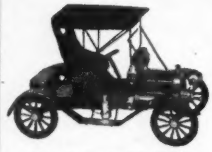

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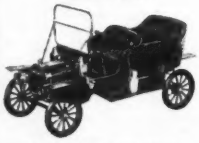

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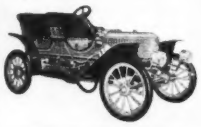

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284 Keeler Bldg. GRAND RAPIDS 2, MICHIGAN

A Racing Runabout

[*Continued from page* 147]

driver's seat should not project more than 3 in. above the deck.

Stem Ornament. To carry out the streamlined effect, a block of soft pine or spruce about 3 in. square is fitted to the deck at the forward end and neatly rounded off and tapered as shown in the outboard profile and deck plan.

Moldings. The main-sheer molding is 1-in. mahogany half-round, screw-fastened to the edge of the deck and the upper seam battens. The boat also has a bilge guard located about 6 in. above the water line, extending from the stern to a point slightly forward of station 4. This can be a piece of 1¼-in. half-round, but it will look better if shaped from a piece of square 1½-in. stock, tapered toward the forward end, with the upper edge sharply beveled to shed water. Plenty of marine glue or paint must be installed under all moldings before they are fastened in place. Additional finished moldings and facing pieces should be installed where needed to cover end grain and improve the appearance.

Fuel Tank. Cylindrical, 14 in. dia. by 30 in. long, installed where shown, with the fill pipe carried up to the deck and the vent pipe carried aft through the upper edge of the transom, where there should be a shield to keep out water. The tank rests in 1½-in. spruce chocks bolted to the sides of the engine bed. Two brass 3/16x1½-in. straps, lined with brake lining, pass over the tank and draw down with turnbuckles. Additional chocks should be fastened to frames 1 and 2 at the ends of the tank to prevent any lateral motion. Install a shutoff valve and strainer at the bottom of the tank and lay flexible tubing from there to the carburetor. If the boat is to be used only for racing, the tank can be reduced to the point where it will carry only enough gasoline to complete the longest race in which *Spanker* will be entered.

Exhaust Pipe. The exact run of the exhaust pipe cannot be predetermined without knowledge of the motor to be installed, but in general it should sweep outward and downward from the manifold, around the end of the fuel tank, close to the side of the boat, and thence through the transom. A pipe of the flexible type is suggested. At the transom, a hole 1 in. greater in diameter than the exhaust pipe is bored. The space between the wood and the exhaust pipe is then filled with asbestos. Two brass flanges fitting losely around the pipe are next applied, one on the inside and the other on the outside of the transom. The two flanges can be drawn together with bolts. The fittings should only be tight enough to prevent

water from entering the boat—the pipe should not be clamped tightly enough to prevent its lengthening when heated.

Strut and Shaft Log. The shaft log should be of the metal type, to suit the shaft, and bolted on top of the keel over a canvas and white-lead gasket. The strut will probably have to be made to order and should bolt through the keel and keel batten.

Rudder. To be approximately 9x12 in., of the shape shown, passing up through a brass port with locknuts on the inside and outside. A stuffing box is screwed to the stern knee. To carry the weight of the rudder, a bearing is fitted between the stuffing box and the quadrant. There will be a tendency for the movement of the rudder to loosen the stuffing-box gland. This should be prevented by boring a small hole in the gland and providing a spring and lockpin. The 12-in. quadrant is coupled to the steering wheel with ⅜-in. flexible bronze or stainless-steel cable passing over sheaves no less than 2½ in. in diameter. The sheaves are bolted in place and located so they can be lubricated.

Ventilation. Air is provided for the engine through the holes in the forward end of the hatch. The outlet can be through the after cockpit, but the appearance of the boat will be improved if two brass louvers are installed, one on each side of the hull, about as shown, over holes bored through the planking to carry off the heat and fumes.

Lights. If the boat is to be used solely for racing and run during the daylight hours only, no lights will be required. If she is ever to be operated after sundown, the government requirements call for a combination light forward and a stern light, which should preferably be mounted on top of a flagstaff, on the after deck. Such lights, if used, are wired to the storage battery and equipped with the necessary switches on the dash. A trouble-light plug should be fitted in the cockpit.

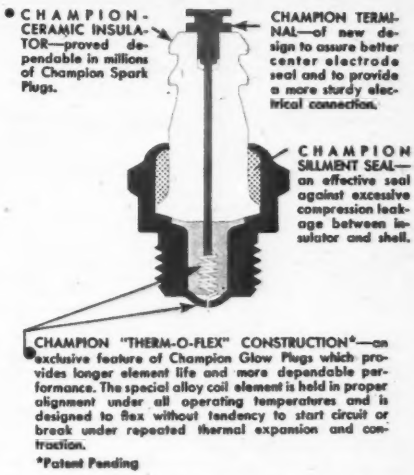
Deck Fittings. There are two 4-in. open-type chocks forward and three 6-in. cleats, two aft and one forward, all bolted through fillers. There are also the fuel-tank filler pipe, a flagpole socket (if lights are to be used), and any additional equipment needed to comply with federal or local laws. It is suggested that rubber step plates over fillers be located abreast of the two cockpits.

Painting. The inside of the hull should receive not less than two coats of paint or varnish. Give the outside of the hull not less than two coats of hard racing composition on the bottom, two coats of deck paint, and three coats of topside paint or varnish. If desired, the topsides can be given a two-color scheme, following the line on the profile. •

ANNOUNCING

CHAMPION

V GLOW PLUGS



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THREAD LENGTH	7/32"	7/32"	3/32"
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"V" SPARK PLUGS WEIGHT, GRAMS	V 8	V-2 3½	V-3 2½

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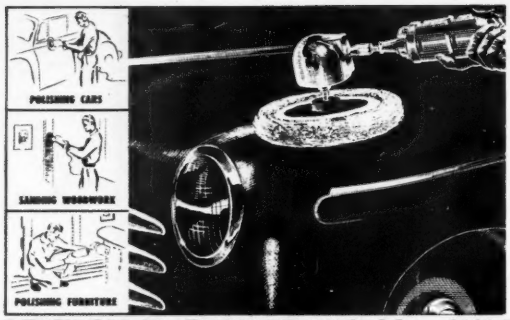

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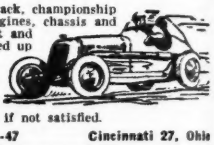

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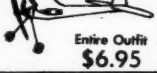

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Myths About Marijuana

[*Continued from page* 60]

strength. *I can do anything.* But, strangely, I'm content just to float above my chair. Now I feel good. My joy is delirious.

I start giggling. I laugh loudly when a companion merely asks me for a match. It's silly—but I can't help it. The world is swirling with lights and fun.

Now a third smoke . . . a fourth. This time my hands feel huge, my feet miles away. I'm afraid to step out of the chair. A small downward step is like a deep plunge into a dark abyss.

That's the danger point. I wish I could stop smoking, but I can't. Suddenly I feel I'm soaring around the room. I spot a small vase and plunge into it. I swim around. Then I'm choking and frantically fight my way up for air. Finally I crawl out, gasping.

A portrait on the wall comes to life, the girl in the picture stretches out her hands, grasps my throat. I scream. . . .

At this point a smoker who has a minor neurosis—and who hasn't—can be shocked into insanity by a terrifying hallucination. So far, I've escaped, but I live in fear of weird, mind-shattering delusions.

The morning after, my throat is parched. A dull ache throbs in my head, just behind the eyes. I am ravenously hungry. The headache and dry lips persist until nightfall. I feel I must crawl back to a dope den to escape the grim agony in my mind.

Some young people try marijuana as a love-making stimulant. They have been told that one moment of romantic passion seems to linger for hours under the influence of marijuana. This type of time distortion, I have learned, rarely happens. Most addicts find reefers a sexual depressant rather than a stimulant.

A word about the cigarets themselves. Marijuana is the Indian name for common hemp, an annual plant which grows from six to 15 feet high, in almost any kind of soil. Its legitimate use is in the manufacture of rope. Frequently, it grows wild in empty lots, along railroad sidings, in back yards. It's even been cultivated in window boxes.

Four years ago a group of scientists, appointed by the late Mayor Fiorello LaGuardia, explored the marijuana problem in New York City and published their findings. They gave the stuff in measured doses to 70

[*Continued on page* 152]

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Myths About Marijuana

[*Continued from page* 151]

prisoners in one of the local jails and watched their reactions. Here's what they decided:

"Marijuana is not habit-forming. . . . It has very little to do with the commission of major crimes. . . . It does not lead to juvenile delinquency. . . ."

The report pointed out that the 70 prisoners appeared lazy throughout their bout with the drug. They showed no desire for action and never got into fights with one another.

The report added that no cases of mental weakness resulted from the use of marijuana. Bosh! The men simply didn't smoke enough to reach a crisis. Some of the deadliest myths about this evil drug may be traced back to this extremely limited and inconclusive prison study.

Listen to what the powerful American Medical Association has to say about that report:

". . . The report draws sweepingly inadequate conclusions which minimize the harmfulness of marijuana."

The A. M. A. cites a report by six noted physicians who made a similar study and found a *direct link between crime and marijuana.* These doctors point to the case of a 16-year-old boy who began smoking after he read the LaGuardia Commission report. In a short time the lad's mind began failing him.

Dr. Walter Bromberg, physician in charge of the psychiatric clinic in the New York City General Sessions Court, also helps explode that myth about marijuana having no effect on the mind:

"Thirty-two cases of mental disease are traceable directly to marijuana."

Every law-enforcement official in the country, including district attorneys and Federal narcotics agents, right down to local police officers, has insisted that there is a definite link to crime. They say reefer peddlers operate where school children gather. They make countless arrests each year, for crimes ranging from pickpocketing to murder, and the police record always states that the criminals were under the influence of marijuana.

The Federal Narcotics Bureau warns:

"There can be no compromise with those who are enslaving our youngsters to a habit which results in swift deterioration of mind and morals and that has been *exacting daily toll in murders, thefts and excesses of all kinds.*"

Take it from one who fell for a myth about marijuana. Try smoking a reefer for the kick. You'll really get that kick—right into the gutter! •

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How to Enlist at the Top

[*Continued from page* 65]

with whom I talked, you will not have much time to notice meager surroundings. The reason lies in a 55-page book, each page single spaced and a foot long, which outlines every minute of the 960 hours you will spend in class, physical training, field work, drill and practical demonstrations.

But, let's follow you through the school. From the instant you show up at Camp Forsyth you are under inspection—even during your sleeping hours. Col. Robert Lutz and Lt. Col. Elwood Spackman, who head the school, know more about you and your potentialities than any school heads you have ever encountered. Within a week, Maj. Read, Battalion Commander, and Maj. Wood, Operations Officer, will know your exact standing in your class.

Then, each of the 110 instructors you'll encounter will have something to say about you and your grades. Your tactical officer is usually a lieutenant whose course is not so far behind him that the details are forgotten. There's one of these "tact" officers to every 50 candidates and he has you under observation from reveille to taps. He watches the way you fall in for morning inspection and observes your manners at mess. In class he takes notes on your recitations and the timber of your voice. He's always making notes.

Most important of all, you must pass the inspection of your fellow candidates. The Army has perfected a "Buddy System" to accomplish this which out-Buddies any system you've ever run across.

Since an officer is an executive who must appraise men, the Army says, part of your training will be to appraise your fellow candidates. Three times during your six months in school you will write a confidential report on each of the candidates in your platoon. After your estimate of a candidate has been checked against those of other candidates and counter-checked against reports of school officials, the Army should have a fair idea of your ability as well as his.

Here again you'll probably feel some resentment. There's no doubt that it's a super-spy system and anyone lacking in qualities desired in an officer will find it impossible to conceal his weaknesses. But on the other hand, if you've got the stuff these reports will protect you from being washed out by a snap

[*Continued on page* 154]

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How to Enlist at the Top

[*Continued from page* 153]

decision. And in the final analysis, everybody will be served best if the weak links are eliminated before it's too late.

By the time you reach the end of the six months, many of your classmates will have fallen by the wayside. *In some classes as many as 48 per cent have failed to pass the course!* More selective screening has greatly reduced this number, however. I talked to a group of candidates a few days before they were to receive their commissions and the consensus of opinion was that although no single part of the program is overwhelmingly difficult, it takes steady plugging to get by. One of the fellows said, "It's like a hurdle race—all the hurdles are easy but after you've jumped hundreds they all look a mile high."

By the time you complete your course, the Army will have spent about $17,000 in cash on your training and hundreds of valuable man-hours of instruction. In return, the Army will expect to gain a competent officer.

While I was investigating this new Army plan for MI, I figured I might as well get a few figures straight on the retirement plan. And Brother, it really had me drooling. You can retire after 20 years of service at half of your base pay. Or in thirty years at 75 per cent. Let's say you've worked your way up to colonel (quite probable after 30 years as an officer). Your monthly pension check would come to around $400. In order to collect that same amount after 30 years of work as a civilian, you would have been paying $200 a month all during the 30 years! So, when you start weighing the possibility of joining up, make sure you put some of that pension gold on the scales.

My investigation of this plan for training officers revealed the bad points as well as the good. Admittedly, from your civilian point of view, there are drawbacks. Probably the major one is that—officer or enlisted man—you're in the Army for a three-year hitch. And of course, there's no denying that the course is rugged—the Army made it that way on purpose.

But there's also no denying that the Army has put its cards on the table. The opportunity to serve your country as an officer is actually there. You must decide for yourself whether you want to take a shot at it—it's a big decision to make and neither the Army nor MI can make it for you. So, check the balance carefully on your own books.

Then, if your answer is yes, you'll be able to do something which GI's and civilians have dreamed of doing since men started making war—enlist at the top! •

Rear-Engine Car

[*Continued from page* 69]

recognized this. In almost all models, the front hood has been retained.

The driver, in his perch way up front, is minus the protection of the heavy engine and its frame, it is claimed. Steering will not be as positive since not enough weight will bear down on the front wheels. Engine cooling, too, is another problem.

What can be said in favor of the rear-engine car? The driver can be moved forward for better visibility. Added weight in back gives better traction. Noise and engine heat are eliminated from the passenger compartment. Fewer engine parts are necessary; one of the first to go would be the long drive shaft and its bulge in the car floor.

That Pontiac and a number of other GM "bustle buggies," told the engineers the pros and cons of the problem.

But the styling section of GM still wasn't convinced. What about those super-streamlined beauties the artists have been playing up as the "cars of the future"? You've seen plenty of them. Three persons in front, looking through the swept-back windshield. There is no hood on this creation—remember, the engine's way back out of the way. In the rear seat are three passengers with engaging grins on their faces, happily contemplating life.

There wasn't enough evidence against the rear-engine to warrant its complete dismissal. If the body could be styled to fit, and if enough advantages could be found in it to outweigh the objections to its engine location, GM would have itself a new car.

To answer these questions, they built a rear-engine car which they called the Corsair. It's a three-eighths life-size, natty little model, just like one of those futuristic dream-wagons the artists have conjured up. But here's what they had to do with it. Do *you* like it?

To make room for the front wheels to turn and to give the driver all the extra visibility the design is supposed to afford, they had to put him all by himself up front. With the wheels fully turned, only 34 inches remained between them for the driver's legs. To accommodate the passengers, two more seats were necessary. The overall effect was that of a *bus*.

This, in the GM minds, was enough of a reason to pigeon-hole the idea. At least for the time being.

The Corsair is undoubtedly GM's "car of the future." Will it ever be produced? It has been tested. Its advantages and disadvantages are known. If you, the motoring public, demand this style car, GM won't have any alternative but to take it from its moth balls, wipe it off, and hand it over. •

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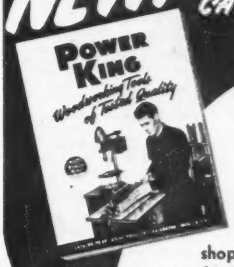

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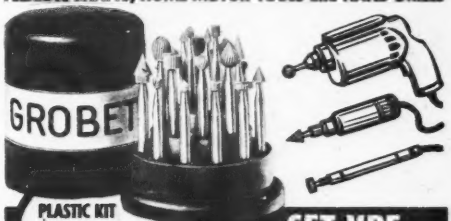

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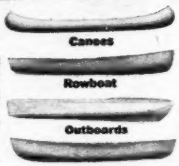

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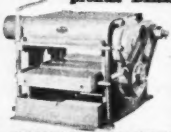

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He's a Rat Farmer

[*Continued from page* 71]

the suffering and prolonged the life of the late Babe Ruth.

McKinney was a professional singer but three years as chief inspector in a Long Island City war plant proved too much for his nerves and left him at 34 too jittery to continue his job or to return to a singing career.

"What else can you do?" his doctor asked as he was convalescing during the spring of 1945.

Searching his mind, he thought of his hobby and said, "Raise white mice."

Anybody else might have snickered. Dr. Edwin Zabrisky didn't. He knew of the soaring laboratory demand for fast-breeding rats and mice, because their cells resemble man's and because they make ideal stand-ins for controlled experiments. Picking up the phone, he called Dr. Charles Slanetz, head of the Laboratory Animals Department over at Columbia University and director of a project for supplying Army and Navy researchers with testing stock. Dr. Slanetz asked McKinney to stop in.

From Dr. Slanetz, he learned that raising lab animals would be harder than just fooling around with white mice as a hobby. The test stock must be uniform and free of disease, or experiments wouldn't mean a thing. The scientist recommended Sherman white rats and Swiss-Albino white mice, all highly inbred stock.

At Middletown, it all looked easy at first when the litters began appearing. McKinney had $100 worth of stock in his wife's unusual train "luggage"—40 rats and 150 mice. He was confident he'd get a government contract and start selling soon.

The pregnancy period of a mother rat or mouse was only 21 days. There were about 10 to a litter. He'd sell some and keep the rest to build up his breeding stock. The young would be ready to breed 12 weeks after birth. It took the young only 21 days to be weaned and ready to sell, at $1.25 for a rat and 30 cents for a mouse.

He had 400 rats and mice—counting the new litters—when, one day that first December, a mysterious disease struck his little livestock. He thought it was just "snuffles"—a common cold that affects rats and mice and isn't serious. Then the young started having convulsions. To add to his worries about this strange affliction, the mothers developed a pink ruff around the neck. That, he had heard, indicated lack of proteins in the food.

Nothing helped. The little fellows began dropping over dead. Then, in desperation, he

[*Continued on page* 158]

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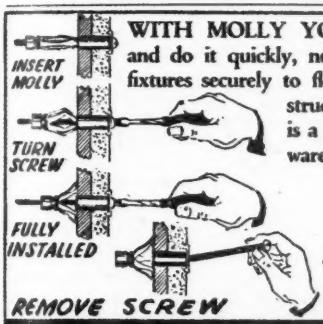

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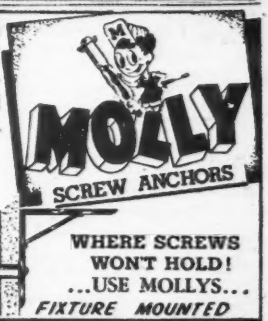

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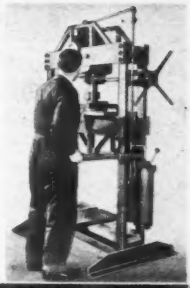

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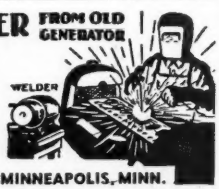

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He's a Rat Farmer

[*Continued from page* 156]

tried a chicken feed recommended by a friend.

It worked almost over night, like a miracle. The weak survivors got back on their feet. The boils and convulsions disappeared. The white hair became glossy again. Of the 400 rodents he had before that protein plague hit the attic, he had only 30 left.

After he licked that mysterious death, he determined to raise the healthiest rats possible. He began suspending the breeding cages from the ceiling, so they wouldn't get any contamination from the floor. He set up germicidal lamps to keep down odors and purify the air. On each cage hangs a water bottle with a glass tube through which the rodents suck chlorinated water.

For bedding, he uses only fresh, kiln-dried shavings from a nearby sawmill. He refuses any that's been lying around. There's too much chance of mold or infection by "wild" rats and mice, which are carriers of the dread disease, paratyphoid. This is similar to typhoid fever in humans and ruins the animals for experiments. Paratyphoid, for instance, changes the percentage of calcium in their blood and makes them useless for research on rickets.

The Funny Farms business is based on keeping breeding stock at high virility. Males are used only six months, and females are kept a year, during which they raise three litters.

Many little things contribute to McKinney's success in raising rats. He cleans the cages twice a week. Once a month he disinfects them with a mixture of carbolic acid, green soap and creosote. A fan keeps sucking purified air through the attic. He sees that this nice, clean air is always kept at 70 to 80 degrees, which he found to be the healthiest temperature for his little livestock.

Funny Farms now seems a little less strange to the neighboring villagers, though they're still surprised that he can make good money out of rats. One oldtimer put it this way:

"Dawg-gone it! I kill rats and here comes McKinney who raises 'em—makes money at it, too!"

His rats are overflowing the attic, and they're busy getting some of the second-floor rooms ready for more.

Rats, of course, have an unlovely reputation. But McKinney loves the friendly little animals and he's proud to raise them and call himself a rat farmer. They helped him escape a real ratrace in the big city. Not only are they giving him more money than he ever made before but he's living a fine life of peace and quiet. Anybody who's scrambled for a living in New York will know what he means. •

Professor Shrinkproof

[*Continued from page* 75]

cone for wearing a hole in the seat of his pants. To the elder John, it's a scientific observation of the effect on cotton of a process called Permel finish. After proving that Johnny's pants resisted a thorough scraping on the sidewalk, he could report back to Cyanamid that Permel positively did not reduce the resistance of cotton cloth to abrasion.

Permel, like Sheerset a resinous finish, is designed to make cotton cloth water repellent. There have been water repellents before, but they reduced the tensile strength and the resistance to abrasion and never lasted long. You can wash or dry-clean a Permel-treated garment without affecting the finish in any way.

Permel undoubtedly is Johnny's and Diane's favorite. In testing it at home, their father had little trouble persuading them to spill tomato juice on the Permel-finished couch slip cover and splatter mud over each other's clean Permel clothes. While they were testing Permel, Johnny and Diane had a wonderful time playing in the mud in the backyard. After they had splattered each other thoroughly, Dorothy wiped them off with a damp rag and they looked as fresh as new. John reported back to the laboratory that he had confirmed the lab experiments: Permel is proof against any stain soluble in water.

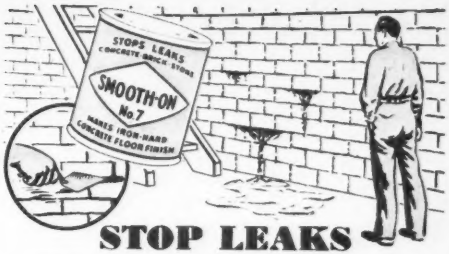
Such fancy antics as these unusual home tests make Johnny and Diane the envy of all the other kids in the neighborhood. When they play house, for example, and pretend they're going on a trip, they don't have to make shift with old rags to pack in their small toy suitcase. They can have one of their mother's freshly laundered cotton dresses or one of their father's cord suits to fold and crumple. While they think they are having a wonderful time, actually they are performing the definitive test for something called Superset, a crease-resistant finish for cotton.

Superset added to Professor Shrinkproof's local reputation as an eccentric. For a while, he seemed to be wearing a pair of cotton slacks with one leg pressed and one leg unpressed. However, it was very logical—when he explained it. One leg of the slacks was Superset-treated, the other untreated. It was an ideal way to make a comparative observation of the treatment in action.

As a result of this test, this summer you will be able to buy cord or other cotton suits that you can wear a couple of weeks without their looking as if the suit had been designed as a dust cover for an accordion.

Just as often as the Derrig children are the envy of the neighborhood youngsters, they are

[*Continued on page* 160]



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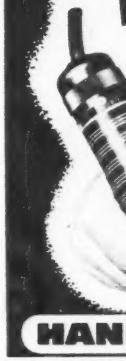

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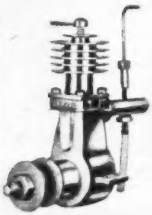

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Professor Shrinkproof

[*Continued from page* 159]

the despair of the neighborhood parents. While he was working on Permel, John wanted to test for another property; he started washing the car with a pair of treated overalls. When Diane came up, he invited her to turn the garden hose on him while he thoughtfully pirouetted about under the spray. Finally he was satisfied that Permel made the overalls water resistant.

A couple of neighbors' children, noting this shennanigan, were equally inspired—if not scientifically prepared—when they turned the garden hose on *their* parent. The result was literally a washout. That irate parent probably will never see the humor of the situation.

"I suppose it does look crazy sometimes," John admits about his home experiments on fabrics. "But it's really important. There's no doubt that our laboratory experiments are conclusive. When I talk with our customers, or anybody else who is interested in better fabrics, I like to be able to talk from personal experience. That's why I jumped out of the boat with my jacket on while I was fishing. It wasn't impulsive. I happened to think that it would be a good experiment."

He was referring to an early spring dunking he gave himself while wearing a plaid wool jacket, to try out a process that makes wool water repellent. Anyone who has ever worn woolen socks knows that, no matter how careful you are in washing them, eventually they shrink to baby size and become so tightly knit that they feel like the felt in your hat. With this process you can wash a woolen blanket or tweed suit with no ill effects.

"The point is that these finishes," he continues, "are thermosetting resins. That means they are durable and stay good no matter how many times a garment is washed or cleaned. Also, an important fact to remember is that, unlike previous efforts, they do not affect the tensile strength or the abrasive resistance of the cloth. In addition, they allow a cloth to be treated for two purposes at once—for instance, water repellence and crease resistance. That saves a lot of time and money."

Recently while the crease-resistant formula was being discussed at the laboratory, one elderly jokester asked facetiously:

"Say, do you think it would do anything for the wrinkles in my face?"

Everybody laughed, but his colleagues noted the thoughtful expression in Professor Shrinkproof's eyes. They won't be surprised if in ten years or so, when wrinkles begin to appear in his face, he tries a Superset facial. If it works, maybe he'll change his nickname to "*Professor Wrinkleproof.*" •

Octopus Wrestling

[*Continued from page* 78]

nohu was approaching. This treacherous little fish strikes with lightning swiftness, stabbing with its hidden, spiny dorsal fin which ejects a venemous poison.

One day, in the late afternoon, Roo and I discovered a huge monster with 25-foot tentacles in a coral grotto just below the surface of the lagoon. We let out a cry for the natives of the village to assist us. This brute was just too big for two men to handle. With spears, knives and clubs, the entire village arrived to do battle with the giant octopus.

The monster, disturbed by the noise and sensing no escape from its attackers, lashed out menacingly with its long writhing tentacles. As quickly as the grisly arms rose above the surface of the lagoon, the natives slashed them off. In the darkness of the coral cavern, I could see the horrible purplish eyes.

Suddenly, one of the bolder assailants gave a warning shout. Being closer to the monster's lair, he saw that it was emerging from its retreat to fight us in the open. As it rose to the surface, pulling itself up the reef wall by its partly-severed tentacles, I could see that it was of a reddish hue, with a hideous horned head. Then it started rolling toward us. Although its sepia secretion clouded the water during the first stages of the conflict, I could see that its tentacles were really 25-feet long. Partly cut off by the natives' knives, they flayed the surface of the lagoon, groping out for the attackers.

The octopus finally realized its hopeless situation and attempted to escape in its crippled condition. But the natives closed in with loud shouts of victory, hacking the tentacles from its body. I came in close, too, and one of the arms closed around the calf of my bare leg. Shivering at the touch, I slashed desperately with my knife, severing the tentacle. When I peeled the grisly fragment away, the skin came with it. For months I carried the red scar of the octopus' kiss on my leg!

A few final blows of the natives' spears and knives ended the life of the repulsive monster. I shall never forget in the last minute of conflict, the moan of fury that the octopus gave when the spears pierced his horned head.

Like to wrestle an octopus? I realize it all sounds like a loathsome sport but it's really more fun than hunting some poor harmless creature. When you wrestle and kill an octopus, you're ridding the marine world of a treacherous enemy.

And you'd better watch your step, too. For there's no such thing as a reckless octopus hunter. You're either careful or dead. •

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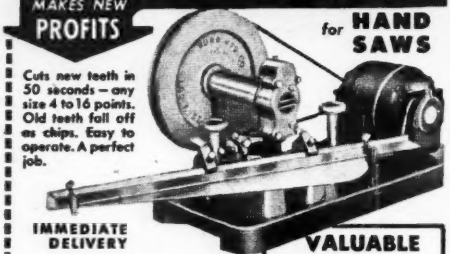

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Emery at Grande Vista
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How Good Are Hunches?

[*Continued from page* 84]

below the master sequence, a separate row for each suit. These are the "guesses" of the master sequence, as made by pure chance. If you repeat this 100 times, the average will be one card in each suit-row corresponding with a card in the master sequence—or one "hit" in every 13 tries.

In tens of thousands of tries, with every combination of "good" and "poor" senders and receivers, hits in the Parapsychology Laboratory tests have averaged 33 per cent above the score expected from chance. A similar percentage was obtained at the University of Colorado by Drs. Martin and Stribic and more recently by Soal and Goldney in London. There have been several perfect scores, and a great many near-perfect. Sustained performances averaging ten hits per run of 25 cards are not uncommon. Several different investigators have obtained such scores.

The clairvoyance test is equally simple. The operator shuffles the deck without looking at it. Then, holding the cards face down behind a large book or screen, he removes the top card and places it face down on the table. Participants are given five to 10 seconds to write down what they think it is. The card is then placed in a box, still without anyone knowing which it is. After all the cards have been thus "displayed," they are removed from the box and recorded. The subjects' records are then checked against this card record and the scores obtained. In the laboratories, clairvoyance scores run about the same as those for telepathy.

Simple home experiments with precognition can be made up as one goes along. Writing down the first five cards that will be dealt from a deck after shuffling can yield surprising results. The laboratories ask subjects to predict the whole sequence of an unshuffled deck as it will be after shuffling.

Distance experiments in telepathy have shown that the psychic power is unaffected by space. Investigations in precognition show it to be equally independent of time. Subjects have predicted the order of cards as they would be days ahead, with a consistency that could not be explained by chance.

The age-old "mind-over-matter" controversy also has been examined in the laboratory. In the psychokinesis tests, the dice are shaken in a mechanical mixer, then automatically tumbled down a chute onto a flat surface. Subjects concentrate on a given face of the dice. Chance does not account for the frequency with which gifted subjects "force" their chosen number to appear.

While no conclusion should be drawn about

ESP or PK without good experimental evidence, we may get some good working ideas of what they are like from the everyday psychic experiences with which we are all familiar. We welcome firsthand reports of them. I refer to hunches, intuitive impressions of things we could not ordinarily know, dreams of future happenings and the like.

An increasing number of psychiatrists are reporting that they find ESP, especially of the telepathic type, cropping up in their treatment of patients. This does not mean that the mentally ill are more likely than the healthy to have such experiences, but it suggests that the close understanding typical of the patient-psychiatrist relation may favor telepathy.

All professional ESP investigators agree that the subject's mental attitude is important. Young children make excellent subjects because they make a game of it. Self-consciousness, boredom and fatigue all work against success in ESP experiments. A relaxed, open-minded, cooperative spirit makes for the best results. To make a good showing, you must really try.

If you do, you may be surprised at what your home-made experiments will reveal—and how good your "hunches" may prove. Patient laboratory work already has opened up a new concept of the scope and power of the human mind and given a hint of even greater things still beyond our knowledge. •

MI Tests '49 Studebaker

[*Continued from page* 91]

unusual that the three cars ahead should be Studebakers? And isn't it amazing to find three such top flight drivers handling them?

Sure—I know you guessed it—they were test cars driven by test drivers heading for the West Coast for a tire company. They sure put me through a few bad hours and you can take it from me that these Studebakers really hold the road in icy going. Incidentally, none of us were using chains or snow tires.

My personal test of these cars came when I finally arrived in El Paso. I was given a '49 Land Cruiser, the de luxe job of the Commander line. As soon as it was warmed up, I headed for the mountains where there was still a trace of snow. And I was impressed with the added power and steering qualities.

I think the Studebakers, with their 15 by 650 tires are the best steering cars in America today. The ratio has been raised from old standards—but even so you don't have to wind them up like a 50-cent watch with a broken mainspring in order to negotiate a corner. They'll really answer the slightest touch of the wheel. This accounts for their super-

[*Continued on page* 164]

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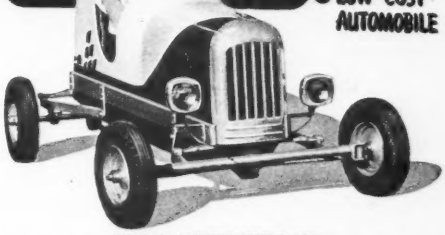

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MI Tests '49 Studebaker

[*Continued from page* 163]

iority in snow and ice and gives the driver some skid control. Also, I found that they hug the road admirably, with little sway on curves.

On one mountain, I decided to test the riding qualities a little farther and give the car an exaggerated roadability try. So I left the road and followed a path over loose stones and rocks. I skidded the car around narrow bends and bounded over gulleys. On level stretches I built up speed and at one point gave a coyote a hell of a chase. I bet if Paul Hoffman (ex-Pres. of the Studebaker Corporation) could have seen me, he would have left the Marshall Plan flat just to tell me—"Look! We build automobiles, not goats!"

But I found the riding qualities superb and the roadability and sure-footedness far better than the average guy will ever need. This run would have cracked the back of many cars now being sold at similar prices. And the Studebaker's only casualty was the loss of a loose hub cap. Back on the highway again, I was curious to see if I had uncovered any new squeaks or noises. They were bound to show up then, if ever. .Over regular rough roads, the car was as silent as a fish's kiss.

There isn't a better name than Studebaker in the entire automobile industry. They've always put out excellent products—and even more important—honest ones. This can't be said for all the rest of the car manufacturers, unfortunately. If there's any place where pride in workmanship still exists in the auto industry, it's in the Studebaker plant. They build good, honest cars to the best of their ability. And the public gets more than just an even break—it gets a fine car in the bargain.

Frankly, I think the Studebaker Commander and Land Cruiser are excellent buys from the standpoint of luxury and dollar-for-dollar value. There are undoubtedly autos in their price range which can top them in either speed, power or acceleration—but none by very much. And when you weigh all factors, for the average car-owner Studebaker looks like the top buy. •

SPECIFICATIONS

ENGINE: 6 cylinder, L head type
POWER: 100 hp at 3400 rpms
COMPRESSION RATIO: 6.5 to 1
ACCELERATION: in second—from 10 to 50 mph in 13.2 secs. in high—from 10 to 60 mph in 20.6 secs.
WHEELBASE: Land Cruiser—123 inches Commander—118 inches
ROAD CLEARANCE: 7½ inches
SPEED: maximum 80.7 mph with overdrive—92.7 mph
MILEAGE: approximately 19 mpg
PRICE: (approximate factory) Champion—$1688 Commander—$2019 Land Cruiser—$2327

Fortress on a Skyhook

[*Continued from page* 95]

the odds favor an open-jet engine, with hydrogen as a working fluid.

A space ship designed around such a power plant is shown in the illustration for this article. Intended for exploratory cruises in space, and later, for use as a supply tender to a large, permanent satellite base, the craft is equipped with the heavy-duty landing-gear necessary in frequent shuttle trips. The three landing legs incorporate long travel shock-absorbers, are self-leveling for touch-down on rough terrain and are fully retractable in flight. The wells that contain these legs have ladders leading to the various decks. When unfolded, the inner surfaces of the lower elements form runways to the ground for emergency access. The space-ship tender is 200 feet long and 33 feet in diameter with its landing-gear retracted.

Pressurization, oxygen supply and air conditioning for the tender would be old stories to designers of modern transports. Instruments, communications radio and navigational radar may be readily adapted from existing apparatus. Compact, powerful, liquid-fuel rocket motors are available for takeoff and landing. The Air Force already has designed flying suits that would need only slight modification for use in space. The only real lack, then, is a suitable power plant. And that's on the way!

Given an atomic rocket ship, capable of limited flights into outer space, the practical problems of setting up a man-made moon as an armed base become immediately pressing.

For a temporary, experimental outpost, a 600-mile altitude would appear the more practical, since in this pioneer stage the shorter distance would make communications and access to the outpost easier.

Later a 22,300-mile range would probably make a better orbit for the permanent base. Then it could be "hooked" almost anywhere in the sky in an apparently fixed position over some particular target over the earth. Also, because of the greater distance, a base 22,300 miles outward bound from our globe would make a better platform for studying cosmic rays and for scientific observations of heavenly bodies.

A fleet of eight space ships would be required to complete the job of assembling our space base. One would be a basic-unit ship, a little longer than the base's diameter. Five would be material ships and two, space tenders. The extra tender provides a necessary safety factor, to maintain supply service in case of damage or crackup.

[*Continued on page* 166]

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Fortress on a Skyhook

[*Continued from page* 165]

The base, however, is almost self-sufficient. By using pumpkin plants growing in soilless gardens, as a source of oxygen, the fortress makes its own atmosphere on the principle of the balanced aquarium. The commander of the base can produce heat or cold in any desired degree by means of reflective or absorptive surfaces. To keep the men from floating about like balloons in the air inside the fortress, magnetized floors and clothing will act as artificial gravity and thus help maintain normal living conditions. From the sun's direct rays, the fortress can draw unlimited power by utilizing their heat in a steam generating plant. Reflected from a shallow, dish-shaped, sodium mirror, the rays are focused on boiler tubes encased in a black, absorptive surface.

The superheated steam thus produced is piped down through the boiler-supporting stalk into a turbine-generator room below the mirror.

The advantages offered by the fortress in the sky are tremendous. Astronomers not only could make their observations 24 hours a day but also, because of the absence of atmosphere, would find these observations infinitely sharper and more detailed than any possible on earth. Scientists could map the moon as from a low-flying plane. They could survey the more distant planets with similar ease, study their special conditions and their atmospheres and analyze their physical properties by spectrograph.

From the military point of view, the power that mans this fortress on a skyhook can control the world. From an altitude of more than 22,000 miles, the whole earth would lie in the base's bombsight. The fortress could launch its missiles almost with a push of the hand, to coast down on the wings of gravity. Unimpeded radar could track such a missile to the very moment of impact, then evaluate the deadly results. Search radars also would give ample warning against any counter-attack by enemy rockets.

Luckily, the nation that is actually speeding plans for this all-powerful base in space is none other than America. Because as a nation we still hate war, we may offer our projected space weapon to the United Nations to assure international order, after adequate provisions for safeguarding our own security have been guaranteed.

In the hands of the UN this permanent fortress on a skyhook might hang like a big "quiet" sign over our ever-brawling little world—and make that peace pretty permanent, too. •

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Not an intermittent duty drill, but a full size rugged tool. Most convenient type switch, natural grip handle, and balance like a six-shooter. Precision cut gears—turbine type cooling blower—extra long brushes. No stalling under heaviest pressure because of powerful 110 Volt AC or DC motor and multiple ball bearing thrust. Other bearings self-aligning lifetime-lubricated Oilite type. Made for toughest year-in and year-out service in plant or on construction jobs. Amazing perpetual factory guarantee assures you of a lifetime of trouble-free use. **Full refund (you pay transportation) if not pleased with drill after trial.**

SOS *EMERGENCY TRANSMITTER* SOS

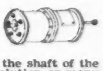
This is the famous Gibson Girl Transmitter that saved so many lives during the war. It is used as a distress call transmitter on boats and airplanes. The Gibson Girl is the easiest transmitter in the world to operate. No instruction or experience necessary. No external power supply required for operation. It is merely necessary to turn the crank on the top of the transmitter and power is generated and the distress signal is automatically sent out on the international distress frequency. Brand New Gibson Girl transmitter complete with tubes **$9.95.**

Antenna Kit for Gibson Girl transmitter. This kit was designed to improve the effectiveness of the Gibson Girl Transmitter by increasing the range several times. The kit includes 300 feet of special antenna wire, two balloons for raising the antenna in calm weather, two hydrogen generators to inflate the balloons, a special box kite for antenna erection in windy weather, and a searchlight, powered by the crank operated generator in the transmitter. Complete kit **$9.95.**

Book on DRY DISC RECTIFIERS by H. B. Conant, nationally recognized authority on the subject. Theory and practical applications **$ .25**

SENSATIONAL, FASCINATING, MYSTERIOUS SELSYNS

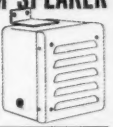
Brand new Selsyns made by G. E. Company. Two or more connected together work perfectly on 110V AC. Any rotation of the shaft of one Selsyn and all others connected to it will rotate exactly as many degrees in the same direction, following unerringly as if the units were connected together by shafting instead of wire.



This is true whether you twist the shaft of the master unit a fraction of a revolution or many revolutions. Useful for indicating direction of weather vanes, rotating directional antennas, or controlling innumerable operations from a distance. Complete with diagram and instructions. Per Matched pair **$4.95.**

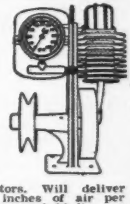
Brand New LS7 PM SPEAKER

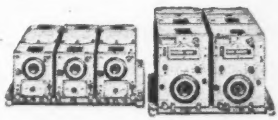
in a fully-enclosed black crackle finished metal cabinet. This speaker and case match communication receivers, and in addition make perfect intercom remote stations. Our price, **$4.50.** Including output transformer ----**$4.95**



COMPRESSED AIR INSTANTLY ANYWHERE

Portable Air Compressor and storage tank. Ruggedly built of best materials using lifetime lubricated ball-bearing on connecting rod and oil impregnated main bearing on shaft. Unusual design forever eliminates valve trouble, the most common fault in air compressors. **PATENTED** unique air intake system increases efficiency tremendously over other compressors so that air output is much greater than that from larger compressors powered by heavier motors. Will deliver approximately 3500 cu. inches of air per minute at maintained pressure of 30 lbs., or will inflate a 90 lb. truck tire in less than one minute. Comes complete with 100 lb. gauge, although finger-tip adjustment allows setting of output pressure at any value, which will automatically be maintained. Works from any ¼ H.P. motor. Useful for spraying paints or lacquers, disinfectants, insecticides, annealing or brazing with natural gas, inflating tires, etc. Price **$14.50** postage prepaid anywhere in the U.S. Efficient, completely adjustable syphon type spray gun complete with 12 ft. of 100 lb. tested hose available for only **$7.75** with pint container, also prepaid. 25% required on all C.O.D. orders.





SCR—274N COMMAND SET

The greatest radio equipment value in history

A mountain of valuable equipment that includes 3 receivers covering 190 to 550 KC; 3 to 6 MC; and 6 to 9.1 MC. These receivers use plug-in coils; and consequently can be changed to any frequencies desired without conversion. Also included are two Tuning Control Boxes; 1 Antenna Coupling Box; four 28 V. Dynamotors (easily converted to 110V. operation); two 40-Watt Transmitters including crystals, and Preamplifier and Modulator. 29 tubes supplied in all. Only a limited quantity available, so get your order in fast. Removed from unused aircraft and in guaranteed electrical condition. A super value at **$34.95,** including crank type tuning knobs for receivers.

BEST BUY OF MONTH

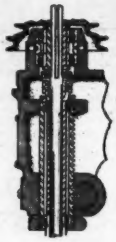
SOUND AMPLIFIER—Brand new, 2 stage triode amplifiers having 2 of the valuable and scarce ouncer type coupling transformers that sell for over **$10.00** a piece. Neat aluminum case, fully enclosed (largest dimension 6 inches). Perfect for intercom systems, phone amplifiers, mike amplifier, or signal tracer amplifier for testing radio sets. A sensational bargain at only **$3.40** each.

All sales final and no returns unless otherwise specified in ad of item. Right reserved to change prices and specifications at any time. Cable address BUFRAD.

BUFFALO RADIO SUPPLY, 219-221 Genesee St., Dept. MI BUFFALO 3, N. Y.

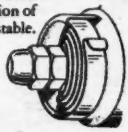
FOUR PRECISION BALL BEARINGS

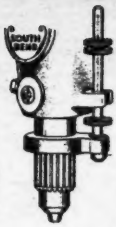
Two on spindle, two on drive sleeve. Pre-lubricated and sealed precision type, no oiling required.



ADJUSTABLE QUILL RETURN SPRING

Retracts quill instantly upon release of feed lever. Tension of spring adjustable.



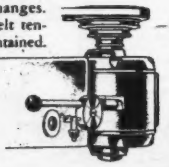


DEPTH GAUGE

Controls feed depth, length of return stroke, or locks spindle in any position. 16th graduations.

BELT TENSION RELEASE

Flip of lever removes tension from belt for easy speed changes. Proper belt tension maintained.



BUILT-IN LIGHT

Provides shielded, shadowless illumination on work area. Independent on-off switch is built-in.

NEW!

SOUTH BEND 14" Drill Press

INTERCHANGEABLE SPINDLES

Spindles available to take No. 2 Morse taper shank tools, and for 1/2" straight shank tools, router bits, shaper cutters, etc.

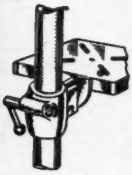
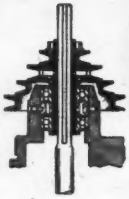


TABLE LOCK

Double-plug binder securely locks table to column. Eliminates misalignment. Column bearing is NOT split.

FREE-FLOATING SPINDLE

Design prevents misalignment, side thrust and whip. Precision splines in spindle and sleeve.



QUILL BEARING ADJUSTMENT

Shoe-type take-up provides feather-touch tension and secure locking. Quill bearing is NOT split.

CAPACITIES — SPECIFICATIONS

CAPACITY
Maximum drill size in iron or steel—½". Drills to center of 14¼" circle.

CHUCK
Capacity—0 to ½"

SPINDLE
Regular drill chuck type supplied. Travel . . . . . 4"

CHUCK TO BASE DISTANCE
Bench Model—17"
Floor Model—46½"

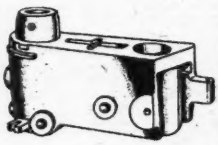
SPINDLE SPEEDS
Four—655 to 4530 r.p.m.

TABLE SIZE
10" x 10". Tilts to any angle.

Bench Model $129.30

Floor Model $144.30

Prices, f.o.b. factory, include drill chuck and 1/3 h.p., 115 or 230 v., 1 ph., 60 cycle motor and switch.



ONE-PIECE HEAD CASTING

Insures perfect alignment. Double-plug binder locks the head to column. Column bearing is NOT split.

SOUTH BEND LATHE WORKS

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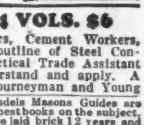

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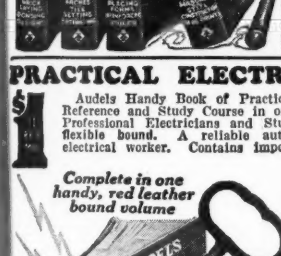

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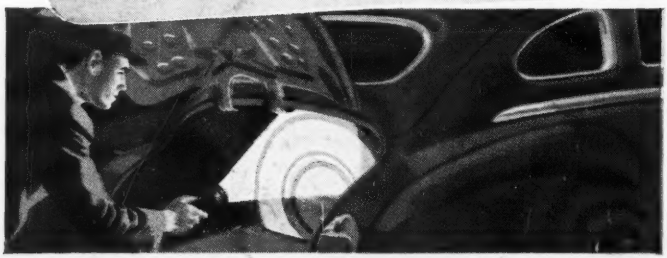
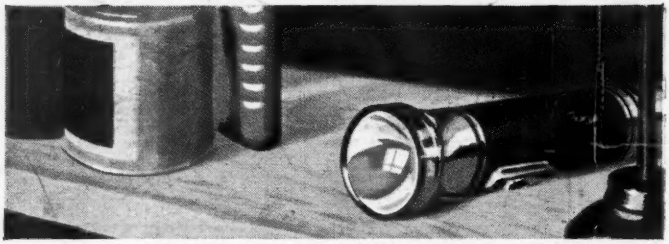
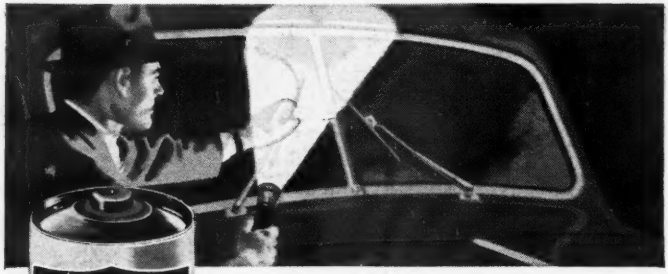


Just as an active cat...



takes a cat nap and...



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